JANUARY 2001
ISSUE #482
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THE NEW!

73 Amateur Radio Today

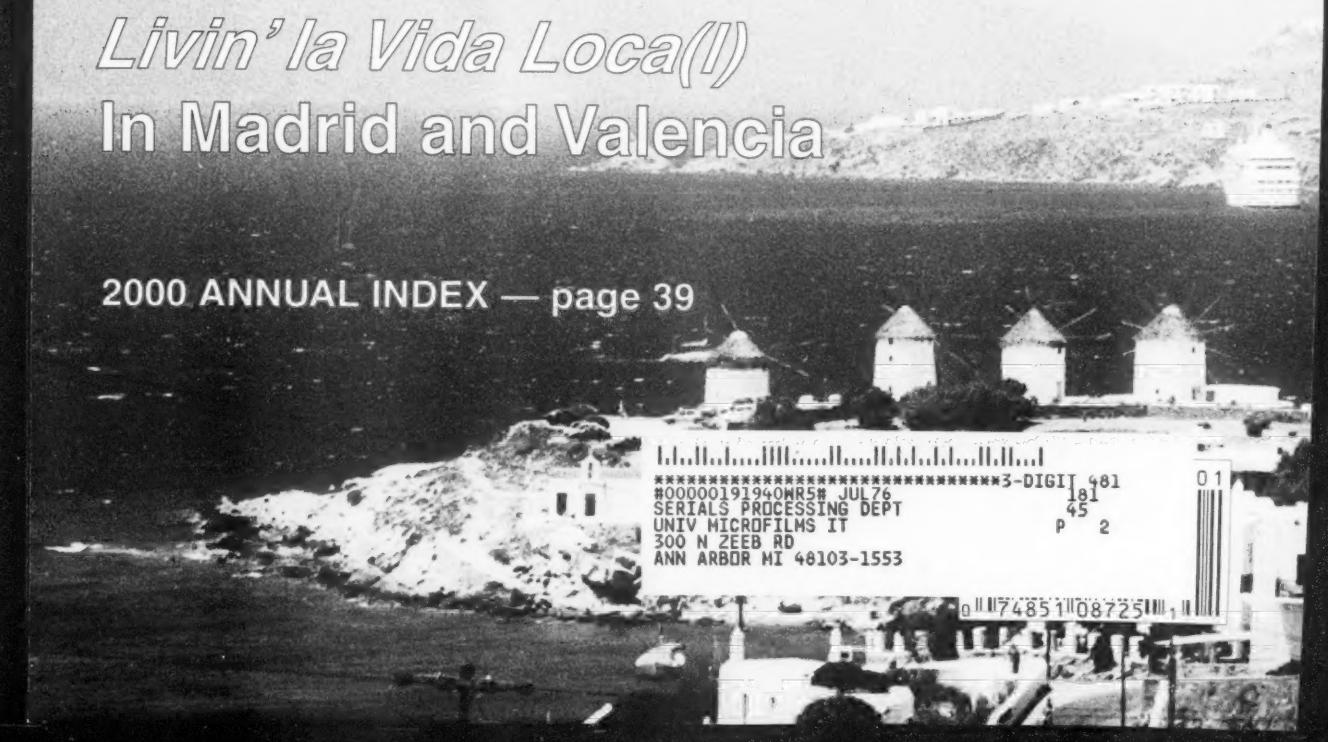
DXpedition: SV8 Mykonos (cover)

Secrets of:
- Transistors
- Tuners

Kiwi ATV Project

Livin' la Vida Loca(l) In Madrid and Valencia

2000 ANNUAL INDEX — page 39



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Sell your old HT.
You'll want one of these.
DJ-196T VHF HT • DJ-496T UHF HT

Alinco introduces two new HTs that are affordable, packed with features, rugged, easy to use and dependable. High power output batteries are standard, as are features like CTCSS and DCS encode/decode, alphanumeric display and autodialer. Alinco also gives you unconventional extras like a theft alarm and an experimental mosquito repelling tone.

Did we say affordable? Call your Alinco dealer today!

DJ-196T VHF HT

DJ-496T UHF HT

- Alphanumeric display
- 40 memories + Call channel
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- Autodialer
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- 13.8 VDC direct input with battery charge feature
- DJ-196T 5 watts output with standard battery TX 144 ~ 148 MHz
  RX 135 ~ 174 MHz
- DJ-496T 4 watts output with standard battery TX/RX 430 ~ 450 MHz
- CTCSS and DCS encode/decode + European Tone Bursts
- Theft Alarm
- Experimental Mosquito Repel feature

Simple ▪ Clean ▪ Dependable

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Alinco's Toyama facility is ISO-9002 certified.

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ISSUE #482

THE TEAM

El Supremo & Founder
Wayne Green W2NSD/1

Associate Publisher
F. I. Marion

Executive Editor
Jack Burnett

Managing Editor
Joyce Sawtelle

Technical Editor
Larry Antonuk WB9RRT

Contributing Culprits
Mike Bryce WB8VGE
Jim Gray II
Jack Heller KB7NO
Chuck Houghton WB6IGP
Andy MacAllister W5ACM
Joe Moell KOOV
Steve Nowak KE8YN/5
Dr. Rick Olsen N6NR

Advertising Sales
Evelyn Garrison WS7A
21704 S.E. 35th St.
Issaquah WA 98029
425-557-9611
Fax: 425-557-9612

Circulation
Frances Hyvarinen

Data Entry & Other Stuff
Norman Marion

Business Office
Editorial - Advertising - Circulation
Feedback - Product Reviews
73 Amateur Radio Today Magazine
70 Hancock Rd.
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E-Mail
design73@aol.com

Web Page
www.waynegreen.com

QRX . . .

The Law: W6OBB Settles

Retired radio show host Art Bell W6OBB has settled his defamation lawsuit against a radio station and another talk show host. Bell said that both had defamed him.

You may recall that last year talk show host Art Bell W6OBB retired from broadcasting to pursue litigation against those he claimed had defamed him on the air. In his earlier May 1998 court filing, W6OBB charged that on December 9, 1997, one Ted Gunderson had broadcast a radio show transmitted by WWCR. Bell said that during the course of that show a guest by the name of David Hinkson made statements that may have left the listening audience with the belief that Bell had been charged with child molestation.

These statements were false. In fact, Bell claimed that he would carry on his litigation until he was totally vindicated. And it now appears that he was successful.

In an October 20th posting to the *Coast-To-Coast AM* Web site, it was announced that, having received an apology and retraction, Bell had agreed to a settlement which releases Gunderson and the radio station from the legal action. The rest of the terms of the

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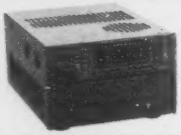

MODEL SS-10TK

MODEL SS-12IF

SPECIAL FEATURES:

- HIGH EFFICIENCY SWITCHING TECHNOLOGY SPECIFICALLY FILTERED FOR USE WITH COMMUNICATIONS EQUIPMENT, FOR ALL FREQUENCIES INCLUDING HF
- HEAVY DUTY DESIGN
- LOW PROFILE, LIGHT WEIGHT PACKAGE
- EMI FILTER
- MEETS FCC CLASS B

PROTECTION FEATURES:

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- OVERVOLTAGE PROTECTION
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- OVER TEMPERATURE SHUTDOWN

SPECIFICATIONS:

INPUT VOLTAGE: 115 VAC 50/60HZ
OR 220 VAC 50/60HZ
SWITCH SELECTABLE

OUTPUT VOLTAGE: 13.8VDC

AVAILABLE WITH THE FOLLOWING APPROVALS: UL, CUL, CE, TUV.

MODEL SS-18

DESKTOP SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-10	7	10	1⅛ x 6 x 9	3.2
SS-12	10	12	1⅞ x 6 x 9	3.4
SS-18	15	18	1⅞ x 6 x 9	3.6
SS-25	20	25	2⅞ x 7 x 9⅝	4.2
SS-30	25	30	3¾ x 7 x 9⅝	5.0

MODEL SS-25M

DESKTOP SWITCHING POWER SUPPLIES WITH VOLT AND AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SS-25M*	20	25	2⅞ x 7 x 9⅝	4.2
SS-30M*	25	30	3¾ x 7 x 9⅝	5.0

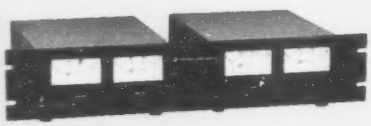
MODEL SRM-30

RACKMOUNT SWITCHING POWER SUPPLIES

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25	20	25	3½ x 19 x 9⅝	6.5
SRM-30	25	30	3½ x 19 x 9⅝	7.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M	20	25	3½ x 19 x 9⅝	6.5
SRM-30M	25	30	3½ x 19 x 9⅝	7.0



MODEL SRM-30M-2

2 ea SWITCHING POWER SUPPLIES ON ONE RACK PANEL

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30-2	25	30	3½ x 19 x 9⅝	11.0

WITH SEPARATE VOLT & AMP METERS

MODEL	CONT. (Amps)	ICS	SIZE (inches)	Wt.(lbs.)
SRM-25M-2	20	25	3½ x 19 x 9⅝	10.5
SRM-30M-2	25	30	3½ x 19 x 9⅝	11.0

MODEL SS-12SM/GTX

MODEL SS-10EFJ-98

CUSTOM POWER SUPPLIES FOR RADIOS BELOW

EF JOHNSON AVENGER GX-MC41
EF JOHNSON AVENGER GX-MC42
EF JOHNSON GT-ML81
EF JOHNSON GT-ML83
EF JOHNSON 9800 SERIES
GE MARC SERIES
GE MONOGRAM SERIES & MAXON SM-4000 SERIES
ICOM IC-F11020 & IC-F2020
KENWOOD TK760, 762, 840, 860, 940, 941
KENWOOD TK760H, 762H
MOTOROLA LOW POWER SM50, SM120, & GTX
MOTOROLA HIGH POWER SM50, SM120, & GTX
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
MOTOROLA RADIUS & GM 300
UNIDEN SMH1525, SMU4525
VERTEX — FTL-1011, FT-1011, FT-2011, FT-7011

NEW SWITCHING MODELS

SS-10GX, SS-12GX
SS-18GX
SS-12EFJ
SS-18EFJ
SS-10-EFJ-98, SS-12-EFJ-98, SS-18-EFJ-98
SS-12MC
SS-10MG, SS-12MG
SS-101F, SS-121F
SS-10TK
SS-12TK OR SS-18TK
SS-10SM/GTX
SS-10SM/GTX, SS-12SM/GTX, SS-18SM/GTX
SS-10RA
SS-12RA
SS-18RA
SS-10SMU, SS-12SMU, SS-18SMU
SS-10V, SS-12V, SS-18V

*ICS – Intermittent Communication Service

RAMSEY

Doppler Direction Finder

Track down jammers and hidden transmitters with ease! This is the famous WA2EBY DF'er featured in April 99 QST. Shows direct bearing to transmitter on compass style LED display, easy to hook up to any FM receiver. The transmitter - the object of your DF'ing - need not be FM, it can be AM, FM or CW. Easily connects to receiver's speaker jack and antenna, unit runs on 12 VDC. We even include 4 handy home-brew "mag mount" antennas and cable for quick set up and operation! Whips can be cut and optimized for any frequency from 130-1000 MHz. Track down that jammer, win that fox hunt, zero in on that downed Cessna - this is an easy to build, reliable kit that compares most favorably to commercial units costing upwards of $1000.00! This is a neat kit!!

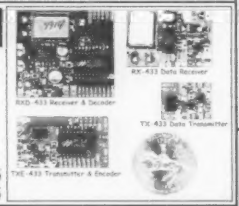
DDF-1, Doppler Direction Finder Kit $149.95

1 GHz RF Signal Generator

A super price on a full featured RF signal generator! Covers 100 KHz to 999.99999 MHz in 10 Hz steps. Tons of features; calibrated AM and FM modulation, 90 front panel memories, built-in RS-232 interface, +10 to -130 dBm output and more! Fast and easy to use, its big bright vacuum florescent display can be read from anywhere on the bench and the handy 'smart-knob' has great analog feel and is intelligently enabled when entering or changing parameters in any field – a real time saver! All functions can be continuously varied without the need for a shift or second function key. In short, this is the generator you'll want on your bench, you won't find a harder working RF signal generator - and you'll save almost $3,000 over competitive units!

RSG-1000B RF Signal Generator $1995.00

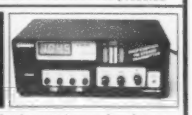
Wireless RF Data Link Modules



RF link boards are perfect for any wireless control application; alarms, data transmission, electronic monitoring...you name it. Very stable SAW resonator transmitter, crystal controlled receiver - no frequency drift! Range up to 600 feet, license free 433 MHz band. Encoder/decoder units have 12 bit Holtek HT-12 series chips allowing multiple units all individually addressable, see web site for full details. Super small size - that's a quarter in the picture! Run on 3-12 VDC. Fully wired and tested, ready to go and easy to use!

RX-433 Data Receiver..... $16.95 TX-433 Data Transmitter..... $14.95
RXD-433 Receiver/Decoder..... $21.95 TXE-433 Transmitter/Encoder..... $19.95

Super Pro FM Stereo Transmitter



Professional synthesized FM Stereo station in easy to use, handsome cabinet. Most radio stations require a whole equipment rack to hold all the features we've packed into the FM-100. Set freq with Up/Down buttons, big LED display. Input low pass filter gives great sound (no more squeals or swishing from cheap CD inputs!) Limiters for max 'punch' in audio - without over mod, LED meters to easily set audio levels, built-in mixer with mike, line level inputs. Churches, drive-ins, schools, colleges find the FM-100 the answer to their transmitting needs, you will too. Great features, great price! Kit includes cabinet, whip antenna, 120 VAC supply. *We also offer a high power export version of the FM-100 fully assembled with one watt of RF power, for miles of program coverage. The export version can only be shipped if accompanied by a signed statement that the unit will be exported.*

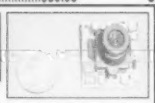
FM-100, Pro FM Stereo Transmitter Kit $249.95
FM-100WT, Fully Wired High Power FM-100. ..... $399.95

World's Smallest TV Transmitters

We call them the 'Cubes'.... Perfect video transmission from a transmitter you can hide under a quarter and only as thick as a stack of four pennies - that's a nickel in the picture! Transmits color or B&W with fantastic quality - almost like a direct wired connection to any TV tuned to cable channel 59. Crystal controlled for no frequency drift with performance that equals models that cost hundreds more! Basic 20 mW model transmits up to 300' while the high power 100 mW unit goes up to 1/4 mile. Their very light weight and size make them ideal for balloon and rocket launches, R/C models, robots - you name it! Units run on 9 volts and hook-up to most any CCD camera or standard video source. In fact, all of our cameras have been tested to mate perfectly with our Cubes and work great. Fully assembled - just hook-up power and you're on the air! One customer even put one on his dog!

C-2000, Basic Video Transmitter..... $89.95 **C-2001, High Power Video Transmitter... $179.95**

CCD Video Cameras



Top quality Japanese Class 'A' CCD array, over 440 line line resolution, not the off-spec arrays that are found on many other cameras. Don't be fooled by the cheap CMOS single chip cameras which have 1/2 the resolution, 1/4 the light sensitivity and draw over twice the current! The black & white models are also super IR (Infra-Red) sensitive. Add our invisible to the eye, IR-1 illuminator kit to see in the dark! Color camera has Auto gain, white balance, Back Light Compensation and DSP! Available with Wide-angle (80°) or super slim Pin-hole style lens. Run on 9 VDC, standard 1 volt p-p video. Use our transmitters for wireless transmission to TV set, or add our IB-1 Interface board kit for super easy direct wire hook-up to any Video monitor, VCR or TV with A/V input. Fully assembled, with pre-wired connector.

CCDWA-2, B&W CCD Camera, wide-angle lens $69.95
CCDPH-2, B&W CCD Camera, slim fit pin-hole lens.. $69.95
CCDCC-1, Color CCD Camera, wide-angle lens $129.95
IR-1, IR Illuminator Kit for B&W cameras $24.95
IB-1, Interface Board Kit $14.95

AM Radio Transmitter

Operates in standard AM broadcast band. Pro version, AM-25, is synthesized for stable, no-drift frequency and is setable for high power output where regulations allow, typical range of 1-2 miles. Entry-level AM-1 is tunable, runs FCC maximum 100 mW, range 1/4 mile. Both accept line-level inputs from tape decks, CD players or mike mixers, run on 12 volts DC. Pro AM-25 includes AC power adapter, matching case and bottom loaded wire antenna. Entry-level AM-1 has an available matching case and knob set that dresses up the unit. Great sound, easy to build - you can be on the air in an evening!

AM-25, Professional AM Transmitter Kit. $129.95
AM-1, Entry level AM Radio Transmitter Kit. .. $29.95
CAM, Matching Case Set for AM-1..... $14.95

FM Stereo Radio Transmitters

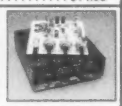
No drift, microprocessor synthesized! Great audio quality, connect to CD player, tape deck or mike mixer and you're on-the-air. Strapable for high or low power! Runs on 12 VDC or 120 VAC. Kit includes snazzy case, whip antenna, 120 VAC power adapter - easy one evening assembly.

FM-25, Synthesized Stereo Transmitter Kit $129.95

Lower cost alternative to our high performance transmitters. Great value, easily tunable, fun to build. Manual goes into great detail about antennas, range and FCC rules. Handy for sending music thru house and yard, ideal for school projects too - you'll be amazed at the exceptional audio quality! Runs on 9V battery or 5 to 15 VDC. Add matching case and whip antenna set for nice 'pro' look.

FM-10A, Tunable FM Stereo Transmitter Kit. $34.95
CFM, Matching Case and Antenna Set $14.95
FMAC, 12 Volt DC Wall Plug Adapter $9.95

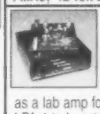
Mini Radio Receivers



Imagine the fun of tuning into aircraft a hundred miles away, the local police/fire department, ham operators, or how about Radio Moscow or the BBC in London? Now imagine doing this on a little radio you built yourself - in just an evening! These popular little receivers are the nuts for catching all the action on the local ham, aircraft, standard FM broadcast radio, shortwave or WWV National Time Standard radio bands. Pick the receiver of your choice, each easy to build, sensitive receiver has plenty of crystal clear audio to drive any speaker or earphone. Easy one evening assembly, run on 9 volt battery, all have squelch except for shortwave and FM broadcast receiver which has subcarrier output for hook-up to our SCA adapter. The SCA 1 will tune in commercial-free music and other 'hidden' special services when connected to FM receiver. Add our snazzy matching case and knob set for that smart finished look!

AR-1, Airband 108-136 MHz Kit. $29.95
HFRC-1, WWV 10 MHz (crystal controlled) Kit $34.95
FR-1, FM Broadcast Band 88-108 MHz Kit $24.95
SR-1, Shortwave 4-11 MHz Band Kit $29.95
SCA-1 SCA Subcarrier Adapter kit for FM radio.... $27.95
FR-6, 6 Meter FM Ham Band Kit $34.95
FR-10, 10 Meter FM Ham Band Kit. $34.95
FR-146, 2 Meter FM Ham Band Kit. $34.95
FR-220, 220 MHz FM Ham Band Kit. $34.95
Matching Case Set (specify for which kit) $14.95

RF Power Booster



Add muscle to your signal, boost power up to 1 watt over a freq range of 100 KHz to over 1000 MHz! Use as a lab amp for signal generators, plus many foreign users employ the LPA-1 to boost the power of their FM transmitters, providing radio service through an entire town. Runs on 12 VDC. For a neat finished look, add the nice matching case set. Outdoor unit attaches right at the antenna for best signal - receiving or transmitting, weatherproof, too!

LPA-1, Power Booster Amplifier Kit $39.95
CLPA, Matching Case Set for LPA-1 Kit $14.95
LPA-1WT, Fully Wired LPA-1 with Case $99.95
FMBA-1, Outdoor Mast Mount Version of LPA-1 ..... $59.95

PIC-Pro Pic Chip Programmer

Easy to use programmer for the PIC16C84, 16F84, 16F83 microcontrollers by Microchip. All software - editor, assembler, run and program - as well as free updates available on Ramsey download site! This is the popular unit designed by Michael Covington and featured in Electronics Now, September 1998. Connects to your parallel port and includes the great looking matching case, knob set and AC power supply. Start programming those really neat microcontrollers now...order your PICPRO today!

PIC-1, PICPRO PIC Chip Programmer Kit $59.95

FM Station Antennas

For maximum performance, a good antenna is needed. Choose our very popular dipole kit or the Comet, a factory made 5/8 wave colinear model with 3.4 dB gain. Both work great with any FM receiver or transmitter.

TM-100, FM Antenna Kit $39.95
FMA-200, Vertical Antenna $114.95

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For Technical Info, Order Status
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NEVER SAY DIE

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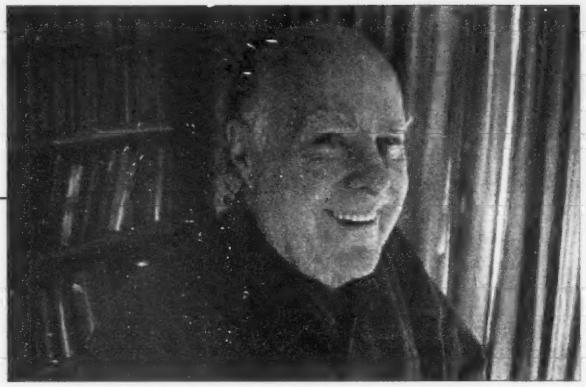

Two Triple Zip

Two triple zip was one helluva ham radio year! The code speed yoke was removed by the FCC, despite every effort of a relay organization which shall remain nameless to retain the car-cranking part of the driver's license exam. This unleashed a flood of Techs on our VEC teams and a bonanza for what had been a badly suffering ham industry.

The timing was perfect. Here we are, right in the middle of one of the best sunspot maximums in radio history, making our ham bands red hot. DX has been pouring through day and night. Six meters has been making new records. It's been a ball.

Now, with February coming up, we're getting into the best time of the year for antenna work. Any pune can put up an antenna in the summer, but it takes a real man to get out there in the snow and freezing weather to put up new antennas. So get busy — order that tower you've been wanting. Get a climbing belt from Bill W2ONV (say hello from Wayne — he'll remember me). Give yourself enough antenna-raising adventures to keep you talking for hours. Maybe you've noticed that I keep writing about the two twin-three beams I put up in ten feet of snow in 1946. Or my 336-element two meter beam up on Mount Monadnock that put a hellacious signal 600 miles down the east coast.

Hey, if you can't find enough listeners to your stories on the air, how about putting 'em into writing for me?

The inrush of Tech upgrades was great for 2000, but soon we'll be back to our most basic problem: attracting teens to our hobby. And I'm not talking about Archie comic books. We need to see the League mount a national PR effort to rebuild the thousands of school radio clubs that were blown away in 1965.

For instance, there are thousands of radio talk shows, all desperately looking for interesting guests to interview. This doesn't cost much to do. Hey, I've been doing my part, talking up the hobby at every opportunity in my talk radio interviews. But we need a dozen or two of us out there doing this.

Yes, You Can Help!

I'd love to have a book available for kids, helping to get them excited about ham radio. Sure, I can regale them with the lifetime of excitement and adventures amateur radio has provided me, but I need your stories, too. Please get busy with your word processor and tell us about the adventures the hobby has provided you. You can't go on DXpeditions via the Internet. Or work seven states on 10 GHz, like I did. Or launch ham-TV cameras from balloons. Or have a ball on Field Day. Or get to personally know people like Barry Goldwater, King Hussein, Jean Shepherd, and Walter Cronkite over the Web. Now, get busy.

DXpeditions 2010

Well, maybe 2020, since I seem to always turn out to be way too optimistic about how quickly new technologies are going to be accepted. Anyway, I want you to sit here and look over my shoulder into my crystal ball and check out what I'm seeing.

The advent of the Kachina, the 100% computer-controlled station, plus the news about $1 Web controller chips got me to start combining these technologies.

Eons ago, in ham years, the more adventurous of us were setting up remote-controlled base stations on mountaintops so we could work out on two meters. This, naturally, led to repeaters, which led to phone patches on the repeaters, which led to the voting receiver system in Chicago, which led to today's cell phone industry.

Now, with the Kachina, we're seeing the more adventurous of us remotely controlling our home stations via the telephone lines. And a few of the even more adventurous interfacing the Kachina home station with the Internet. Okay, now let's suppose that hams in rare countries, tired of being pestered for 30-second QSL contacts, put their Kachina stations on-line so anyone anywhere can fire it up, swing the beam, and tune the band. That's right, an instant DXpedition from anywhere you can access the Internet, and that's getting to be just as easy as we can make HT contacts via our repeaters.

Thirty years ago I set up a Standard repeater in my home shack so I could make DX contacts on 20m via the repeater as I made my morning walks up nearby Pack Monadnock mountain. That sure took the boredom out of my daily exercise. Then I took the repeater (and a suitcase full of HTs) over to Jordan and set up JY73 on top of a hill in Amman, just across from King Hussein's downtown palace, making it possible for all the hams in the area to be in touch.

One of the more exciting contacts of my life was when I was visiting Ray Naughton VK3ATN, in Birchip, Australia, to take pictures of his two-meter moonbounce antenna. I got on the air from his station and had a 5-9 contact with my home station in New Hampshire on 20 meters. Then we tried 75 meters, and I had the thrill of hearing my 5-9 signal on that band, too! Wow!! Now, with the Internet, I'm in daily contact with my ham friends anywhere in the world, so the next relatively small step will be when they interface their stations so I'll be able to get on the air through them from anywhere I can access the Internet. And that's getting to be almost anywhere.

Okay, now let's make all this happen. I want to see you get off your duff and start peppering me with articles on remote basing via the Internet.

73 led the way with 2m FM and repeaters. Now, with your pioneering spirit in gear, let's use *73* to take advantage of the next big step into the future for amateur radio — a marriage with the Internet. Don't just sit there!

How long will it be before we'll be able to work our home station from 100 countries?

Continued on page 42

Big Savings on Radio Scanners

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Bearcat® 895XLT-A1 Radio Scanner

Mfg. suggested list price $729.95/**Special $194.95**
300 Channels • 10 banks • Built-in CTCSS • S Meter
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High
Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125–868.995 MHz., 894.0125-956.000 MHz.

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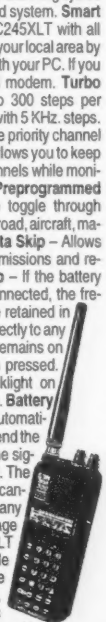
300 Channels • 10 banks • Trunk Scan and Scan Lists
Trunk Lockout • Trunk Delay • Cloning Capability
10 Priority Channels • Programmed Service Search
Size: 2-1/2" Wide x 1-3/4" Deep x 6" High
Frequency Coverage:
29.000-54.000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849.0125–868.995 MHz., 894.0125-956.000 MHz.

Our new Bearcat TrunkTracker BC245XLT, is the world's first scanner designed to track Motorola Type I, Type II, Hybrid, SMARTNET, PRIVACY PLUS and EDACS® analog trunking systems on any band. Now, follow UHF High Band, UHF 800/900 MHz trunked public safety and public service systems just as if conventional two-way communications were used. Our scanner offers many new benefits such as **Multi-Track** – Track more than one trunking system at a time and scan conventional and trunked systems at the same time. **300 Channels** – Program one frequency into each channel. **12 Bands, 10 Banks** – Includes 12 bands, with Aircraft and 800 MHz. 10 banks with 30 channels each are useful for storing similar frequencies to maintain faster scanning cycles or for storing all the frequencies of a trunked system. **Smart Scanner** – Automatically program your BC245XLT with all the frequencies and trunking talk groups for your local area by accessing the Bearcat national database with your PC. If you do not have a PC simply use an external modem. **Turbo Search** – Increases the search speed to 300 steps per second when monitoring frequency bands with 5 KHz. steps. **10 Priority Channels** – You can assign one priority channel in each bank. Assigning a priority channel allows you to keep track of activity on your most important channels while monitoring other channels for transmissions. **Preprogrammed Service (SVC) Search** – Allows you to toggle through preprogrammed police, fire/emergency, railroad, aircraft, marine, and weather frequencies. **Unique Data Skip** – Allows your scanner to skip unwanted data transmissions and reduces unwanted birdies. **Memory Backup** – If the battery completely discharges or if power is disconnected, the frequencies programmed in your scanner are retained in memory. **Manual Channel Access** – Go directly to any channel. **LCD Back Light** – An LCD light remains on for 15 seconds when the back light key is pressed. **Autolight** – Automatically turns the backlight on when your scanner stops on a transmission. **Battery Save** – In manual mode, the BC245XLT automatically reduces its power requirements to extend the battery's charge. **Attenuator** – Reduces the signal strength to help prevent signal overload. The BC245XLT also works as a conventional scanner. Now it's easy to continuously monitor many radio conversations even though the message is switching frequencies. The BC245XLT comes with AC adapter, one rechargeable long life ni-cad battery pack, belt clip, flexible rubber antenna, earphone, RS232C cable, Trunk Tracker frequency guide, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, ESAS or LTR systems. Hear more action on your radio scanner today. Call CEI today at 1-800-USA-SCAN to order your BC245XLT radio scanner.



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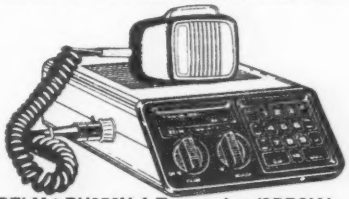

RELM® RH256N-A Transceiver/SPECIAL

Mfg. suggested list price $460.00/**Special $284.95**
Size: 6-1/2" Wide x 10-3/4" Deep x 2-3/4" High
Frequency Coverage: **144.000-174.000 MHz.**

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settlement were said to be confidential. The statement adds that Bell is now looking forward to putting this matter behind him and moving on with his life.

No word at press time about whether Bell planned to return to broadcasting on a regular basis. His former show — *Coast-To-Coast AM* — is currently being hosted by Mike Siegel from his home near Seattle WA.

Thanks to Coast-To-Coast AM, *via Don Wilbanks KC5MFA, via* Newsline, *Bill Pasternak WA6ITF, editor.*

Verizon Scrambles to Accommodate Hams

Verizon engineers are working to correct a serious problem with their Internet service, which adversely impacts amateur radio operators. It seems that Verizon's E-mail system was designed to prohibit the use of a number digit in an E-mail address, which effectively prohibits the use of a ham call.

The problem was discovered by Verizon customer James Alderman KF5WT, who signed up for Verizon DSL Internet service at his Dallas home. When James contacted the Verizon corporate offices in Irving TX, Verizon Media Relations spokesman Bill Kula said they were unaware of the problem and its potential impact on the hundreds of thousands of hams in the USA. Certainly they don't want to exclude so many potential customers.

Kula said that Verizon system engineers consider correcting the problem a matter of "highest priority." The system was said to have been originally set up to prohibit a number digit in an E-mail address to avoid possible billing conflicts arising due to similar log-on and alias names in the system.

Although no timetable was given, the issue is expected to be resolved quickly, as we go to press. Any ham wishing to buy Internet service from Verizon, or any other ISP, is urged to specifically inquire as to whether a ham call can be used in an E-mail address.

For more information, contact Verizon at 1225 Corporate Drive, Irving TX 75038, or at (972) 507-5000.

Thanks to James Alderman KF5WT, Carrollton TX.

***Photo A.** Biloxi Chamber building with 10–40 meter antenna in front.*

The Old Biloxi Lighthouse

Thanks to Ernest "Ernie" Ornan, Jr., W5OXA/W5B/KP2 for this account of International Lighthouse/Lightship Weekend, last August 19–20:

Well here it is again, August, and the temperature is in the upper 90s and climbing, with a heat index of 110 degrees. I have a truckload of equipment and another old dude like myself to help with putting up the antennas. Kim N5XGI, my old faithful buddy, is always there to help me with these situations that I get myself into.

It did not take too long to put up the antennas, but we would have to work for about 10 minutes and then drink water for half an hour. After all the antennas were installed, we then moved into the building, where the air conditioning, fortunately, worked perfectly. We installed all the equipment and checked out the systems, and they were all within mil specs. Now all we had to do is wait until 0001 UTC and start whaling away.

I took the first shift, and we racked up some 100 contacts. By that time I was so tired, wet, and hungry I took my body home, put it into the shower for an overhaul, and then to bed I went. Saturday I was up at the crack of dawn and off for the usual breakfast at our local greasy spoon with the local hams. Kim followed me to the Biloxi Chamber building (our hosts), and we started again. The bands did not seem to be in very good shape, but the old stand-by was hot: 20 meters.

Later that morning, Randy N5UE, a member of our DX group (The Magnolia DX Assn.), dropped by and volunteered his talents in operating. He hung in there for the remainder of the weekend. Darryl KD5CQT, also of the DX Assn., dropped in and operated for a long time, along with another local ham, Frank WA5GDF. Using four operators and one station by 0251 UTC the 19th, we had racked up 607 QSOs, and we called it quits for the night.

Continued on page 57

***Photo B.** Ernie W5OXA after antenna and equipment installation.*

***Photo C.** Biloxi lighthouse as seen from the porch of the Chamber building.*

MFJ 1.8-170 MHz SWR Analyzer™

Reads complex impedance . . . Super easy-to-use

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Here's what you can do

Find your antenna's true resonant frequency. Trim dipoles and verticals.

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Measure your antenna's 2:1 SWR bandwidth on one band, or analyze multiband performance over the entire spectrum 1.8-170 MHz!

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And this is only the beginning! The frequency only on LCD. No meters.

MFJ-209, $139.95. Like MFJ-249B but reads SWR only on meter and has no LCD or frequency counter.

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MFJ-259B is a complete ham radio test station including -- frequency counter, RF signal generator, *SWR Analyzer*™, RF Resistance and Reactance Analyzer, Coax Analyzer, Capacitance and Inductance Meter and much more!

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MFJ's comprehensive instruction manual is packed with useful applications -- all explained in simple language you can understand.

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Fully portable, take it anywhere -- remote sites, up towers, on DX-peditions. It uses 10 AA or Ni-Cad batteries (not included) or 110 VAC with MFJ-1315, $14.95. Its rugged all metal cabinet is a compact 4x2x6¾ inches.

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MFJ *SWR Analyzers*™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Used worldwide by professionals everywhere.

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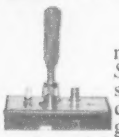
MFJ-219B, $99.95. UHF *SWR Analyzer*™ covers 420-450 MHz. Jack for external frequency counter. 7½x2½x2¼ inches. Use two 9 volt batteries or 110 VAC with MFJ-1312B, $12.95. *Free* "N" to SO-239 adapter.

SWR Analyzer Accessories

Dip Meter Adapter



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LETTERS

From the Ham Shack

Jerry Miller W8IDP, Grand Rapids MI. As a long-time reader of *73 Magazine*, I appreciate articles detailing biographies of hams who have led interesting lives and contributed to our hobby.

However, I am puzzled by some of the data in the article on the life of Jim Gray W1XU/7, SK, in the October 2000 concerning his early license requirements.

I am 79 years old and was one of the very first Novice class licensees in the spring of 1951 following the implementation of Docket 9295, which did away with the old Class A and B structure and implemented the new categories of Extra, General, Technician, and Novice.

This change was the stimulus for great controversy among the old-timers. It was a boon to newcomers like myself whose education (biology) was far from the technical side of ham radio. It was my impression that Docket 9295 was implemented in 1950 and was in full force in 1951 when I got my ticket. Therefore, I am puzzled by the statement that Jim had to spend one full year on CW before taking the Class A exam. I'm sure that the old Class A was abolished in 1951. Perhaps you can clear this up.

I was in graduate school at the time and built an 80m CW transmitter from plans in the ARRL manual. Rigs at that time used balanced output with plug-in coils. My antenna was a long length of TV twinlead. I operated as Novice on the low end of 80m for 3 months and then got my General ticket. I got on 80m phone with a surplus BC696 using a 24V power supply for the 1625 tubes. I built a screen voice modulator from plans in the old *Radio News* magazine, and had a barrel of fun. My receiver was a National NC125, which I still have.

I was QRT for many years, and then in the 1970s built several Heathkits and got back on the air on 40m phone. Unfortunately, when computers came along I got hooked and have been off the air for about 12 years — although my Kenwood transceiver remains ready to go on the air anytime. The fun kind of ran out of operating once all the gear got so commercialized.

Anyway, I do enjoy reading your magazine. Keep up the good work.

P.S. Wayne, I first heard you on the air in about 1951-52 when you were living in upstate New York. You were running a Johnson Viking at the time, and used to contact Sam Harris W8UKS, who specialized in 75m DX.

Hey, Jerry: How dare you waste our time complaining about an SK's memory of his licensing history? Don't you have anything better to do than nitpick something like this, when Jim isn't around to defend himself? ... But seriously, *to answer your question, I don't think W1XU/7 was really speaking for posterity when we were talking about his early years, and/or I could have made a mistake in my notes ... In any event, thanks so much for taking the time to write, and for sharing some of your early doings with us. — J.B.*

Louis D'Antuono WA2CBZ, 8802 Ridge Blvd., Brooklyn NY 11209. I'm looking for the *Guide to Surplus* once published by *73*. Can anybody help?

David Brittenham WAØRVK, Monett MO. It's been almost 30 years since I last wrote you, maybe even longer. I was a very young teen at that time, only licensed a couple of years, and had some stupid idea that I wrote you about. Anyway, that's history, just wanted to see if you remembered me! No? Well, I guess I wasn't that interesting then, huh?

I'm simply writing to let you know that through all those years, I've read nearly all of your editorials, having been a subscriber since late in '67, shortly after receiving my license at the age of 12. While I won't go so far as to say you have been my hero or idol, I DID want to say that you have been my inspiration in many endeavors. Your constant harping at your readers to be better than they currently were had an effect on me. I can't say that I've reached all my potential through all those years, but I CAN say that without some of the prodding from your editorials, I would be less today than I am.

Why am I writing now? Simply to say, "Thank you," for having written the words that got me to thinking about what I wanted to do with my life, to get me to BE something, other than just another factory worker. And for writing the words that KEPT me going, getting me interested in microprocessors, repeaters, etc. I learned most of what I know about electronics from *73 Magazine* back in my jr. high and high school days, sitting in French class, with the (then small-sized) magazine tucked into the textbook. I learned a LOT in that French class, just nothing about French! Same with English grammar. Same with literature. I did pay attention in history, science, and math classes, though!

I never went to college, although I had a full scholarship to the state university. But, I earn more today than any of those other 27 students that graduated with me, including those who went on to college. How did I do it? I read *73 Magazine!*

Thanks again, and maybe I'll write you in another 30 years.

Mark Nelson AA8PS. The best buy I've ever made was my life subscription to *73 Magazine!* I really enjoy your editorials. Everyone else seems convinced that technology either has or will have the answer to all of mankind's problems. It is refreshing to hear from someone with practical suggestions about how we can do something to improve our own lives rather than pay someone else to do it for us. As I've read your editorials mentioning fluoride in our water, I can't help but wonder about the fluoride in toothpaste and mouthwash as well. I'd love to read in one of your editorials of any practical alternatives.

Fluorided toothpaste has killed children who swallowed it. Avoid this poison! It's the brushing that cleans your teeth, not the toothpaste. If you feel the need for something, use plain old salt. — Wayne.

Elmer Sinclair KD4JUH, New Milford CT. Wayne, congratulations on your 78th birthday, the day on which you completed your 78th year. At this time two years hence, when you will be 80, you will have completed the seventh decade of your life.

So it puzzles me that you believe we are now in the first year of the 21st Century. This belief and your acceptance of the fact that there was no "year zero" are inconsistent. Centuries always begin with a year _ _ 01 and end with the completion of a year _ _ 00. I believe this computer age is partially responsible for the confusion; i.e., a decade counter counts from zero to nine.

You remind me of my dear departed wife, whose favorite remark was "I don't care what anybody says!" I admire the spunk, but that is a dangerous philosophy.

Regards from a "barn-dusty" friend. 73

Cabbage: A ... vegetable about as large and wise as a man's head. *Ambrose Bierce* (1842-1914)

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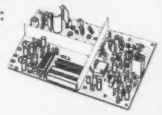

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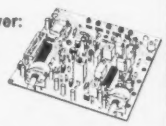

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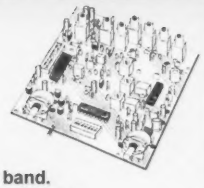

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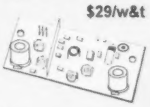

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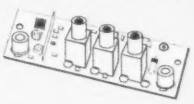

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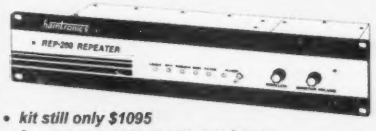

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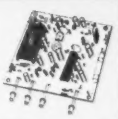

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SV8 from the Geranium

Mykonos is a great DXpedition — once you get there.

I am beginning to think that I carry some sort of a curse as far as air travel to Mykonos is concerned. Or is it just that charter airlines are cursed? In 1997, the airline incorrectly labeled the baggage, and the transceiver almost went to Santorini. In 1998, the 8-meter-high telescopic antenna mast failed to arrive. What could go wrong in 1999?

Mykonos is one of the Cyclades group of Greek islands in the Aegean Sea, about 100 miles east of Athens. The word "Cyclades" derives from the classical Greek "cyklos," meaning circle, and the islands are so named because they form a circle around the sacred island of Delos, the mythical birthplace of Apollo and Artemis. According to legend, Mykonos is the rock which Poseidon used to batter-in the skulls of some giants he found irritating. About 29 square miles in area, the guidebooks describe it as dry and barren, with sandy beaches and dynamic nightlife — Greece's glitziest (and probably most expensive) island. It used to be widely known as the gay center of the Mediterranean, a title more recently lost to places like Ibiza and Sitges in Spain.

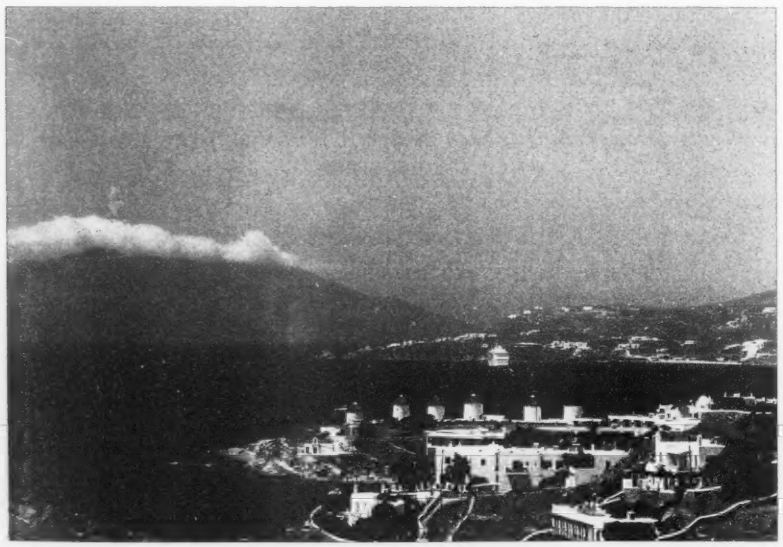

Photo A. Tales of the island's beauty are not unfounded.

From the radio point of view, Mykonos is part of Greece as far as DXCC is concerned, and counts as EU-067 for IOTA purposes. Licensing is simple — under the CEPT Recommendation T/R 61-01, which Greece has implemented, all that is required is to prefix my own callsign with the appropriate host country prefix. Thus, I become SV8/G3SWH when operating in Mykonos. Greece is a European Union member country, so there are no customs problems to worry about either. It can be interesting passing through airport security checks, though, and a good idea to carry your home station license with you at all times.

My wife, Jan, and I have been taking holidays there since 1980. Our two children used to come with us until they got old enough to do their own thing, but this year my son Mark and his girlfriend Janet joined us. It was to be Mark's first visit after a ten-year gap.

We took off on time at 7:00 a.m. on 16 June, with an expected arrival on the island of 1:00 p.m. local time. All appeared to be going swimmingly until we were 1-1/2 hours into the flight, when the captain announced that he had suffered a failure of one of the three hydraulic systems on the A320

Airbus, and that we were returning to London's Gatwick airport for repairs. Amid loud collective groans, he explained he really had no option. Gatwick is the only place equipped to repair his company's aircraft. The alternative of carrying on to Mykonos probably meant the aircraft being stranded there with no repair facilities at all, not to mention a planeload of frustrated returning holiday makers.

We arrived back at Gatwick at around 10:00 a.m., the fault quickly diagnosed as a failed "O"-ring seal, and repairs immediately put in hand. Initially, passengers were asked to wait on board as the repair would not take long. It was a hot day, the aircraft ventilation system had to be shut down, and many passengers were suffering nicotine withdrawal. Thus, after a short while, we were all taken, complete with all hand luggage, back to the terminal building, having been assured of drinks and (for those in need) a smoke. You can imagine the general response when we were ushered into a non-smoking transit area with a drinks machine which was out of order!

The aircraft was repaired in a little over two hours, and we reboarded at about 12:30 p.m. The original crew had been replaced with a fresh one by this time, as the original had exceeded their permitted working hours. The new captain announced he had an air traffic control slot for 1:30 p.m. The ventilation system was now working, and I settled down for a sleep, having left home in Bristol at 1:30 a.m. to drive to Gatwick.

Engines were started on time, and we joined the queue of aircraft on the taxiway. We were next in line for take off when one of the passengers got up from his seat and tried to open the doors, saying he had to get off, as he had chest pains. The crew asked if there was a doctor or paramedic on board. Fortunately, a cardiologist came forward and recommended the passenger go to hospital. We returned to the departure gate. Paramedics came aboard, and the poor fellow was whisked off in an ambulance with his two traveling companions. All their baggage stayed on the aircraft.

Photo B. *Mykonos is famous for its windmills (center bottom in* ***Photo A****).*

We then had to wait for another air traffic control slot, and it was not until 2:30 p.m. that we eventually took off. Apart from a free drink from the airline to compensate us for our troubles, and a second airline meal, the flight was uneventful. We finally arrived in Mykonos at around 8:00 p.m. Amazingly, all our baggage arrived safely.

About the first person we saw was Anagyros, an old friend who runs the Hotel Drafaki, where we had stayed in 1994. He very kindly offered us a lift down the hill to the Geranium Apartments, where we have stayed for the past five years. We arrived just in time to watch the spectacular sunset. Paris, our tolerant and long suffering landlord, was there to greet us, to proudly show us his recently completed swimming pool, and to bring us up to date with all the gossip. We were duly installed in two adjacent rooms, with Jan and I in our usual, #21 on the first floor, which has a balcony with wonderful view of the sea to the south and west.

We first discovered the Geranium during our visit in 1994, whilst exploring. Located on the top of a hill, some 600 feet above sea level and overlooking the town itself, it is a superb radio

Photo C. *The Geranium Apartments.*

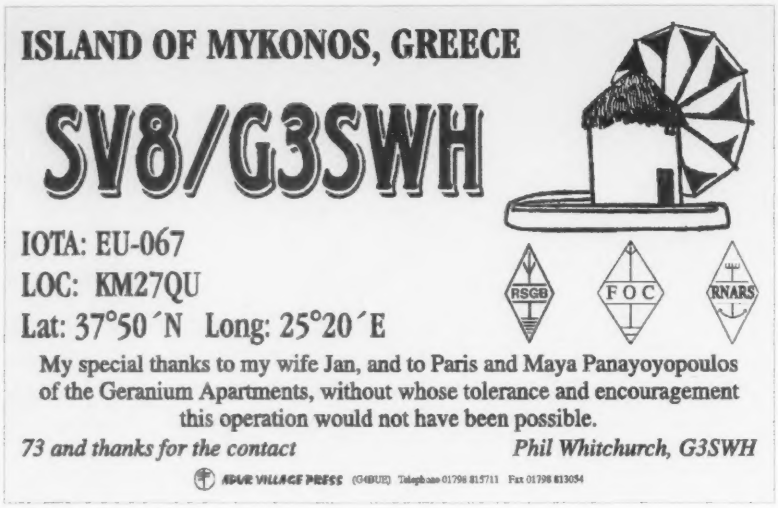
ISLAND OF MYKONOS, GREECE
SV8/G3SWH
IOTA: EU-067
LOC: KM27QU
Lat: 37°50´N Long: 25°20´E
RSGB
FOC
RNARS
My special thanks to my wife Jan, and to Paris and Maya Panayoyopoulos of the Geranium Apartments, without whose tolerance and encouragement this operation would not have been possible.
73 and thanks for the contact
Phil Whitchurch, G3SWH
RSGB VILLAGE PRESS (G4BUE) Telephone 01798 815711 Fax 01798 813054

Fig. 1. QSL card from the island of Mykonos, Greece.

QTH, with a clear takeoff over water to the south, east, and west. The takeoff to the north is less satisfactory, but the land is generally flat.

A quick shower and change of clothes, and we were off into town for dinner and to show Mark and Janet a few of the sights. Mykonos town itself is a tangle of narrow lanes and alleyways; originally designed to confuse attacking pirates, the plan still works on the tourists of today! Dazzlingly white, cube-shaped houses with blue-painted shutters climb up the hill from the bustling, much photographed harbor. Bars, tavernas, discos, hotels, and restaurants line the streets in glorious profusion, but it was an early night for us, in Mykonos terms — about midnight.

When we first visited in 1980, the only way was to get a night charter flight from Gatwick or Luton airports to Athens and then take an early morning ferry from Piraeus, which took about seven hours and called at Syros and Tinos en route. The outgoing journey took a total of something like 16 hours, and the return about 22 hours, so you really had to want to go!

As tourism has developed, Olympic Airways has introduced domestic flights from Athens to the island, but these are prone to cancellation at short notice due to bad weather, which gives potential problems in catching the Athens/London flight home. Direct flights were introduced by a variety of charter airlines using Boeing 737 aircraft. The island's runway is quite short, and the aircraft had to get on the ground within about the first five yards or go around again. It never happened to me!

There was always talk on the island of extending the runway, but the plans involved demolishing an inconveniently sited church and had been stalled for years whilst delicate negotiations were conducted. About three years ago, agreement was finally reached and construction completed over the winter.

I first took a radio with me in 1995, which was the first year we stayed at the Geranium Apartments. Jan was not entirely happy about me playing radio whilst on holiday, but I persuaded her to give it a try with the promise that it would not take over from spending time together. That year, I carried as hand luggage my main station radio — a Yaesu FT-101ZD, which weighs some 44 pounds — and made 743 CW QSOs, including 8 "dupes," with 53 DXCC entities (or was it countries in those days?), in about 13 hours of operating. On-the-air activity was restricted to an hour or so in the mornings whilst Jan was sleeping, and an hour in the late afternoons between returning from the beach and going out for dinner. It is a formula which has worked well for us, both in Greece and other places.

In 1996, I tried to borrow a lighter radio from various friends, but nothing was available, so once again I carried the FT-101ZD as hand luggage. I followed the same operating hours formula and made 1221 CW QSOs, including 53 "dupes," with 54 DXCC entities in about 21 hours of operating. This brought the DXCC score for both years up to 64.

In 1997, the IOTA Committee made one of their Yaesu FT-900AT transceivers available to me. It comes in a

***Photo D.** Things didn't change much from 1995 (left) to 1998 (middle) to 1999.*

beautiful, molded, reinforced, and padlocked carrying case, slightly too large to carry as hand luggage but quite suitable for going in an aircraft's hold. This was the year that the airline mislabeled our baggage and I had to personally retrieve the transceiver from the aircraft hold whilst it stood on the tarmac in Mykonos before going on to Santorini. Eighteen and a half hours operating under improved conditions produced 1164 CW QSOs, including 29 "dupes," with 56 DXCC entities, bringing the three-year total up to 71.

In 1998, I bought a secondhand Icom IC-706 MK I and put together a complete 100 watt HF station in a small suitcase capable of being stowed in an overhead locker. It still weighed about 40 pounds, though! That year, I operated for 24 hours in total and made 1665 CW QSOs and (amazingly) no "dupes," with 65 DXCC entities, improving the all-time total to 83.

I added a secondhand laptop later that year, and 1999's activity had real-time computer logging using CT in DXpedition mode. There were definitely no "dupes" in this year's log! Twenty-four and a half hours of operating produced 1636 CW QSOs with 66 DXCC entities, making a grand total of 92.

Back to our story: Last year, after our early night and a well-earned rest, the first job the following morning was to get the antennas rigged. I've always favored a combination of inverted vee wire dipoles for 3.5, 7.0, 10.1, 14.0, and 18.1 MHz on a common coaxial feeder for such operations. 21.0, 24.9, and 28.0 MHz seem to load quite happily via an MFJ-901B ATU and the whole setup gives good results. In previous years, the center of the antenna has been supported on a short bamboo pole lashed to the chimney of the building, and involved climbing a rickety ladder onto its flat roof. This year, the telescopic mast survived the baggage handlers' best endeavors and I was able to get the antenna much higher than in previous years without risking life and limb. Mark was a great help in getting ready, but a lady resident of the apartments insisted in riding her motorcycle over the wires whilst they were laid out on the ground, and getting them tangled round her front wheel.

There was pressure from the others to get down to the beach, so it was not until late afternoon that I was able to set up the radio on the balcony and make the first QSO with OK1NR at 1448 UTC on 21 MHz CW — a full 24 hours later than intended. Experience has taught me that the balcony is the best place to operate from, preferably helped by a large vodka and tonic. The downside to this is that I have to set up and dismantle the station at the start and end of each session, but this can be achieved in less than five minutes.

A preliminary session of just over 90 minutes produced 131 QSOs. Things

Continued on page 57

Year	Band							Total	DXCC in year	DXCC all-time
	7.0	10.1	14.0	18.1	21.0	24.9	28.0			
1995	74	432	124	113	0	0	0	743	53	53
1996	66	114	786	254	1	0	0	1221	54	64
1997	15	178	394	410	33	134	0	1164	56	71
1998	3	164	737	625	104	32	0	1665	65	83
1999	1	17	123	766	374	352	3	1636	66	92
Totals	159	905	2164	2168	512	518	3	6429	--	--

Table 1. *Contacts summary.*

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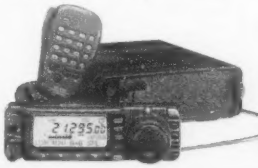

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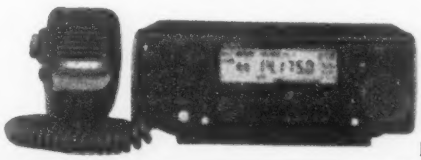
HF/VHF/UHF



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Inside Digital TV/VCR Tuners

Part 5: Decimal-to-binary conversion program.

The four previous sections have discussed the tuner types, a data transmitter, a data receiver, and methods for controlling and testing the digital tuner. It sometimes seems that getting ready to do a project takes longer than actually doing the "work" on it, and working with digital tuners is no exception to the rule.

When it comes to communication with a digital tuner, we must use a language that is understood by the tuner, and that includes the format of the data presented. That brings us to the objective of the BASIC program that's discussed here. We, as hams, deal with frequencies in a decimal number format, but the digital tuner can only handle information in a binary format. Therefore, it is necessary for us to convert from decimal numbers to the equivalent in binary.

Converting numbers from decimal to binary is quite easy and may be done using pencil and paper as was discussed in part four of this series. But for those who would rather let the computer do the "work," then the BASIC program shown here will do that and will provide the data in the correct binary format as shown in **Fig. 1**. **Fig. 2** shows the data flow pattern of the BASIC program with decision points. The program generates and formats the data that can be entered directly into the tuner with the data transmitter switches.

The conversion process is done by sequencing a series of subtraction steps and assigning a "1" or a "0" to each, depending upon the success of the subtraction. As the program runs, ones and zeroes are assigned to number variables and stored until the end of the conversion process. The steps in the process start with determining the desired frequency of the tuner's VCO (local oscillator). Entering either the desired oscillator frequency or the desired receiver input frequency finds the other frequency by calculation. An intermediate frequency (IF) of 47 MHz has been used in the calculation. Although 47 MHz is the frequency that I've chosen to use, TV and VCR systems use approximately 43 MHz (midpoint between 41.25 and 45.75 MHz). Actually, the tuner doesn't care about the specific IF that's chosen, and any IF frequency between 41 and 50 MHz can be accommodated at the tuner's output.

The second step in the calculation process is to divide the VCO frequency by the synthesizer step frequency, which is 62.5 kHz for most digital tuners. The result of the division is a number representing the synthesizer divide ratio that's needed by the synthesizer to "lock" the VCO to the desired frequency.

The third step in the calculation process is to convert the divide ratio from a decimal to a binary format that can be clocked serially into the digital tuner's register.

Upon completion of the calculation and conversion, the program will display the original decimal frequency information along with the formatted binary data that will set up the main frequency divider for the tuner's frequency synthesizer.

For simplicity, printout of the final data has been formatted for display on the monitor in preference to a paper printout.

MSD																		LSD
4	3	2	1	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Band Selectors				Frequency Select Data in a Binary Format														

Fig. 1. Data format required for controlling a digital TV/VCR tuner.

The program

The BASIC program shown in **Fig. 3** is divided into four main parts, with

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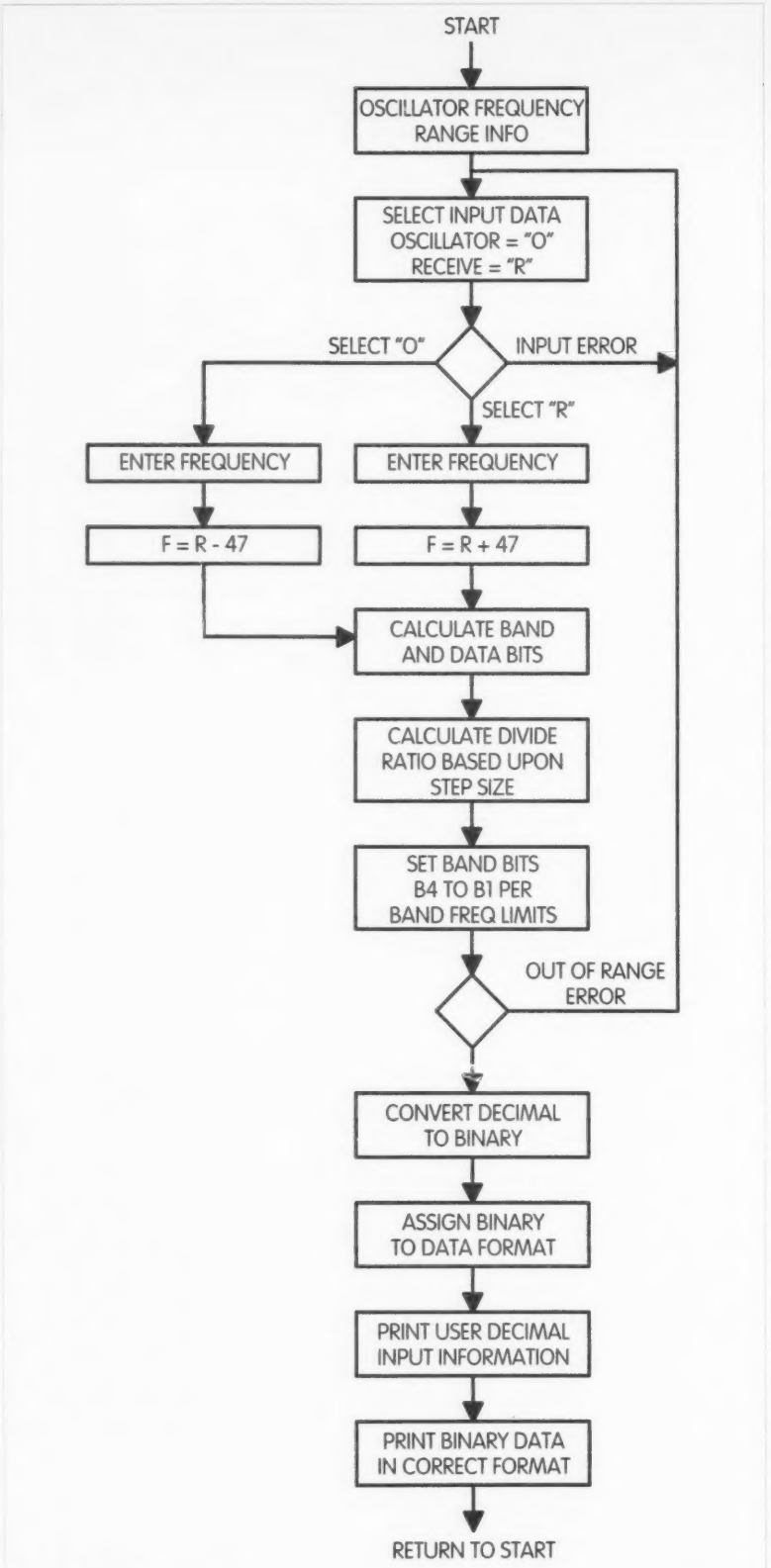
START
OSCILLATOR FREQUENCY RANGE INFO
SELECT INPUT DATA OSCILLATOR = "O" RECEIVE = "R"
SELECT "O"
INPUT ERROR
SELECT "R"
ENTER FREQUENCY
ENTER FREQUENCY
F = R - 47
F = R + 47
CALCULATE BAND AND DATA BITS
CALCULATE DIVIDE RATIO BASED UPON STEP SIZE
SET BAND BITS B4 TO B1 PER BAND FREQ LIMITS
OUT OF RANGE ERROR
CONVERT DECIMAL TO BINARY
ASSIGN BINARY TO DATA FORMAT
PRINT USER DECIMAL INPUT INFORMATION
PRINT BINARY DATA IN CORRECT FORMAT
RETURN TO START

Fig. 2. Flow diagram for a BASIC program that converts decimal frequency numbers to binary and prints data in a digital tuner's required format.

the first being the user interface and input. The second part sets the four band select bits into a binary format. Band bits, as used by the tuner, are not binary, but are "pass-through" one-out-of-four data bits, meaning that the bits represent which synthesizer output band port is to be selected.

The third section of the program performs decimal-to-binary conversion of the divider ratio by a sequence of subtractions and makes the assignment of binary numbers to the number variables. The last section formats the data for display on the monitor.

When I laid out my data transmitter, I used three 8-switch dip switches making for a maximum of 24 binary data entry possibilities. However, the digital tuner can use only 19 of the 24 switches. In an attempt to keep things positioned correctly for minimum data entry into the data transmitter, the binary printout is formatted with the four band bits shown on the left followed by the 15 main frequency divider bits. Spacing is provided between the switch groupings to aid user readability by matching the three blocks of switches. Because of the two-digit offset between the data transmitter switches and the tuner's register, adjusting the placement of the data bit pattern on the transmitter switches is required.

The BASIC code that's used in the program has been done in the most general format possible so that it is suitable for most all BASIC interpreters. Very little conversion of the program lines should be required for it to operate on even the most difficult of BASIC interpreters.

Program changes

There are always changes to be made, so as you work with digital tuners, changes in the way the program presents data will occur. One of the anticipated changes is the step frequency of the synthesizer that you might encounter. As used in TVs and VCRs, the step frequency is 62.5 kHz and is used as such in program line 110. When the tuner can be reprogrammed to operate on a different step

```
10 DIM A$(1)
20 REM 3-WIRE DIGITAL TUNER BINARY CONVERSION PROGRAM
30 REM WRITTEN BY HUGH WELLS W6WTU 9/99
40 PRINT:PRINT:PRINT "TUNABLE RANGE OF THE OSCILLATOR IS": PRINT "96 TO 863 MHZ."
50 PRINT:PRINT "ENTER THE OSCILLATOR OR RECEIVE FREQUENCY IN MHZ."
60 PRINT:PRINT "ENTER (O) FOR OSC OR (R) FOR RECEIVE...";:INPUT A$
70 IF A$="O" THEN PRINT:PRINT "ENTER OSC FREQ...";:INPUT F:R=F-47:GOTO 100
80 IF A$="R" THEN PRINT:PRINT "ENTER RECEIVE FREQ...";:INPUT R:F=R+47:GOTO 100
90 GOTO 50: REM WRONG ENTRY
100 REM CALCULATE BAND AND DATA BITS
110 N=F/0.0625:REM SETS STEP FREQUENCY
120 IF F<=160 THEN B4=0:B3=0:B2=1:B1=0:GOTO 150:REM VHF LOW
130 IF F<=384 THEN B4=0:B3=0:B2=0:B1=1:GOTO 150:REM VHF HIGH
140 IF F<=864 THEN B4=0:B3=1:B2=0:B1=0:GOTO 150:REM UHF
150 IF F<96 OR F>863 THEN GOTO 50:REM VCO OUT OF RANGE CHECK
160 IF N>16384 THEN 180
170 N14=0:GOTO 190
180 N14=1:N=N-16384
190 IF N>8192 THEN 210
200 N13=0:GOTO 220
210 N13=1:N=N-8192
220 IF N>4096 THEN 240
230 N12=0:GOTO 250
240 N12=1:N=N-4096
250 IF N>2048 THEN 270
260 N11=0:GOTO 280
270 N11=1:N=N-2048
280 IF N>1024 THEN 300
290 N10=0:GOTO 310
300 N10=1:N=N-1024
310 IF N>512 THEN 330
320 N9=0:GOTO 340
330 N9=1:N=N-512
340 IF N>256 THEN 360
350 N8=0:GOTO 370
360 N8=1:N=N-256
370 IF N>128 THEN 390
380 N7=0:GOTO 400
390 N7=1:N=N-128
400 IF N>64 THEN 420
410 N6=0:GOTO 430
420 N6=1:N=N-64
430 IF N>32 THEN 450
440 N5=0:GOTO 460
450 N5=1:N=N-32
460 IF N>16 THEN 480
470 N4=0:GOTO 490
480 N4=1:N=N-16
490 IF N>8 THEN 510
500 N3=0:GOTO 520
510 N3=1:N=N-8
520 IF N>4 THEN 540
530 N2=0:GOTO 550
540 N2=1:N=N-4
550 IF N>2 THEN 570
560 N1=0:GOTO 580
570 N1=1:N=N-2
580 IF N>1 THEN 600
590 N0=0:GOTO 610
600 N0=1
610 PRINT:PRINT:PRINT
"OSC F = ";F;" MHZ","REC F
= ";R;" MHZ"
620 PRINT B4;B3;B2;B1;
630 PRINT
N14;N13;N12;N11;"
";N10;N9;N8;N7;N6;N5;N4;N3;"
";N2;N1;N0
640 PRINT:PRINT
650 RUN
```

Fig. 3. BASIC program that generates and formats the required data for controlling a TV/VCR tuner.

value, the step number in line 110 can be changed to accommodate the new step frequency.

Also, I've used an intermediate frequency (IF) of 47 MHz when working with TV/VCR tuners because I've found that frequency to be interfered with less in my local area than perhaps 45 to 46 MHz. The actual center IF frequency for tuners is approximately 43 MHz. Because of the wide bandwidth of the tuner's output resonator, most any receiver tuned to the IF between 41 and 50 MHz should work well. But should the calculation of an IF other than 47 MHz be desired, program lines 70 and 80 may be changed accordingly.

Another possible change is the band bit selection based upon the band of frequencies. The tuner designer has the freedom to choose which of the band bits that he may use for whichever band that is to be turned on. As a result, the band select bits may end up not being in a logical sequence. Program lines 120 through 140 may be changed as desired to provide the band data for the tuner being controlled.

When considering changes to the BASIC program, you should refer to the flow diagram as a reference for where the changes need to be made. The flow diagram provides an overall map of the processes and adding or changing details within the program should "fit" into the map.

Parts six and seven, the last in this series, will discuss a simple process for making printed circuit boards for the data transmitter and data receiver that I used for controlling digital tuners during the study. 73

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Transistor Bias: The Secret Story

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Bias means different things to different folks. To electronics geeks, it means a steady voltage or current applied to an electrode. The bias sets the operating point, the quiescent point, for a vacuum tube or transistor. The bias applied to a device depends on the application, but it is usually set for linear operation.

Occasionally a device may need to be biased to some other point. For example, a class B stage is biased at or near cutoff and a class C amplifier is biased well beyond cutoff.

Bias comes in two flavors: fixed bias and self-bias. With fixed bias, the operating point is set arbitrarily or in accordance with conditions given in data sheets. Data sheets are available from the manufacturer or the distributor.

Two different transistors of the same type might have different h_{FE} and their collector currents would be different with fixed bias. Self-bias is a form of negative feedback in which the bias varies with the way the device operates. While the feedback is seldom large, every little bit helps to stabilize the operating point.

The desired operating point can be determined from the data sheets for a transistor or tube. The data sheet often gives a set of curves that show the relationship between the currents that exist in the device and the controlling current or voltage. Data sheets may just list the output current for various operating conditions but they don't tell you how to set the operating point. That's for you to figure out, and this article tells you how.

In lieu of more specific information from the data sheets on how to operate the device, an understanding of the device will allow you to wing it. Cut-and-try designs are sometimes unavoidable when you want to operate at some point other than what is listed. Some simple tests can give you a starting point.

If a tube or transistor is to have a linear relationship between input and output, the bias point should be chosen to place the operating point in the most linear region of the transfer characteristics. Obviously that's somewhere between cutoff and saturation, but you would like to be a little closer than that. Saturation occurs when an increase in the input does not result in an increase in the output. Cutoff occurs when a change in the input does not cause a change in the output. For junction transistors, saturation occurs when the base-emitter junction is forward-biased and the collector-to-emitter voltage is less than 0.6 V.

The collector current in a bipolar transistor, either NPN or PNP, is proportional to the base current. Since bipolar transistors are current-controlled devices, voltages are seldom shown except as limits. The difference between an NPN and a PNP is the polarity of the voltages applied and the direction of current flow. The base-emitter voltage is practically constant at about 0.6 or 0.7 volts for conducting silicon transistors and about half that for germaniums. That's a bit of information that isn't even mentioned in the data sheets. I guess the manufacturers expect everybody to know that. So now you know.

The bias provides a DC current to the base of a transistor and sets the DC operating conditions. The resistance r_b looking into the base of a common emitter stage is in the range of a thousand ohms, and is the resistance that the signal source must drive. However, when the collector current is a fraction of a mil, the base resistance is higher.

The input resistance r_e looking into the emitter of a common base amplifier is even lower, in the range of a few ohms. The bias effects are the same whether the device is operated common emitter, common base, or common collector. Collector current is proportional to base current, and the base-emitter voltage is about 0.6 V or 0.7 V.

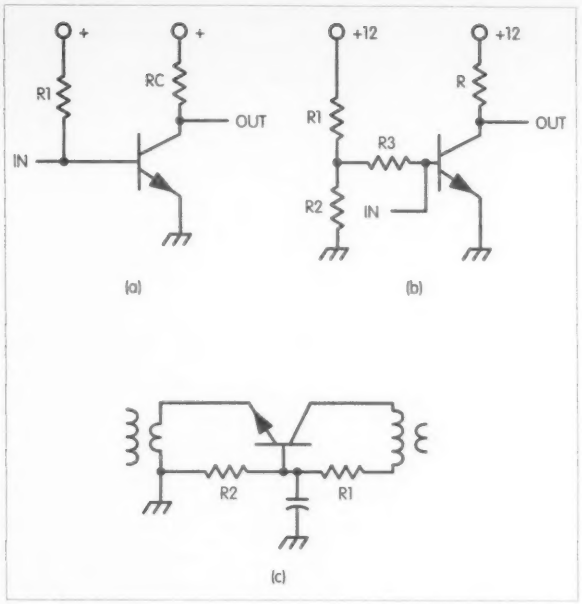

Fig. 1. (a) A common-emitter amplifier can have fixed bias. (b) A common-base amplifier can have fixed bias. (c) A low resistance bias source is required when I_{CBO} is high.

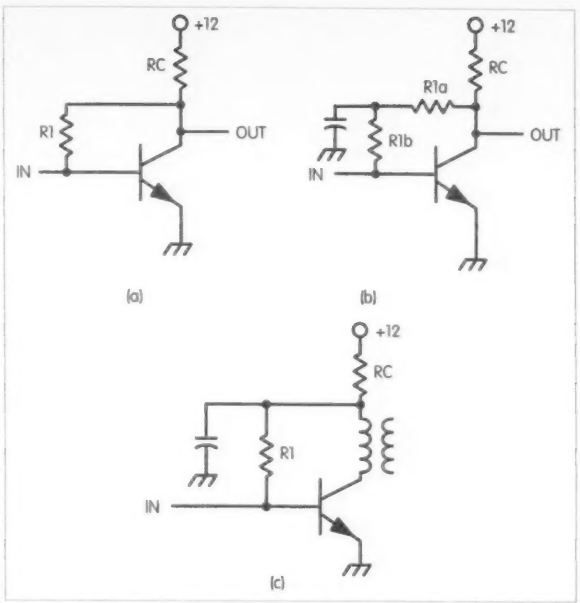

Fig. 2. (a) A common-emitter can be self-biased. (b) Degeneration of AC in self-bias can be eliminated. (c) Self-bias can be obtained with a low DC resistance transformer in the collector.

The DC operation of small transistors is quite similar, even though the AC or RF performance is quite different. Therefore, biasing considerations are the same. For example, the data sheets of the 2N3904, a small general purpose silicon BJT, lists h_{FE} as 100 to 300 when I_C is 10 mA, and 70 minimum when I_C is 1 mA, and 60 minimum when I_C is 50 mA. From these values, it can be inferred that base current will be less than 0.1 mA for 10 mA of collector current, 14 µA for 1 mA of collector current, and 0.83 mA for 50 mA of collector current. This wide variation in h_{FE} implies that the required bias is also not known precisely. Even so, the published information is a starting place. If the h_{FE} is known from measurements, bias currents are known. Otherwise, make a guess from what's given. A procedure for establishing the h_{FE} of BJTs and V_{GS} for JFETs is described later. For the moment, assume that the h_{FE} is known.

Fig. 1 shows a 2N3904 with fixed bias. Ten milliamps of collector current requires less than 0.1 mA of base current. Bias current I_B is provided by R1 and R1= (12 - 0.6)/I_B. When the supply is 12 V and I_B is 0.1 mA, R1 is about 114 k. Because h_{FE} is probably greater than 100, 120 k would be a good starting point.

At high temperatures, I_{CBO}, the collector-to-base current with the emitter open, can be a problem when the bias resistor is high. Silicon transistors have low I_{CBO}, and present no problems except at high temperatures. That is not the case with germaniums.

Limiting bias resistors to a few tens of thousands of ohms for silicon transistors reduces changes in bias with I_{CBO}. An extreme example is a divider of 47 k and 620 Ω from 12 V. The divider will provide 0.1 mA of bias current and I_{CBO} can be ignored. But, the 620 Ω will severely load the signal source. There are alternatives that produce the desired bias current from an acceptably low source resistance.

The resistance of the bias source can be reduced by using a resistive divider to obtain the bias voltage. For example, in **Fig. 1(b)**, a divider, say 3.9 k and 20 k, produces 1.9 V from 12 volts with an internal resistance of $(3.9^{-1} + 20^{-1})^{-1}$ = 3.2 k. To provide 0.1 mA to the 0.6 V base from a 1.9 V source requires a resistance of 13 k..Therefore, an additional series resistance of about 10 k is required. The resistance that loads the signal source is about 13 k in parallel with the base resistance of the transistor r_b. Resistance r_b is in the

Continued on page 20

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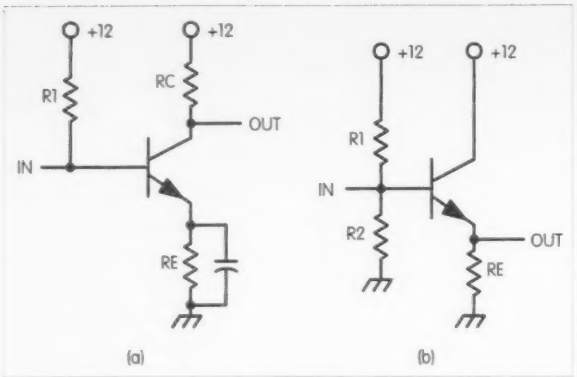

Fig. 3. (a) Self-bias can be generated in the emitter. (b) An emitter follower has self-bias.

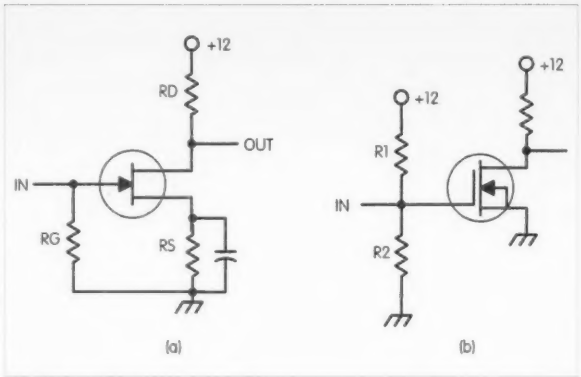

Fig. 4. (a) An FET can be source-biased. (b) A MOSFET can have fixed bias.

Transistor Bias: The Secret Story

continued from page 19

range of 1 k, so the input is essentially driving r_b.

Biasing a common base stage is shown in **Fig. 1(c)**.

The common base amplifier is suitable as an RF/IF amplifier because there is negligible positive feedback from collector to emitter. (That is not the case for a common emitter amplifier at IF.) The resistance looking into the emitter r_e is quite low, but the interstage transformer can transform the low input impedance to the desired level. The base impedance should be essentially zero. A divider of 2 k and 27 k can produce 0.6 volts and 0.1 mA to the base. The resistor values are obtained as follows: The current in R2 is 0.6 V/2 k = 0.3 mA and the current in R1 is 0.3 mA + 0.1 mA = 0.4 mA. The voltage across R1 is 12 V - 0.6 V. Therefore, R1 is 11.4/0.4 mA = 28.5 k ≈ 27 k.

Methods of generating bias in which the bias current decreases when collector current increases with higher h_{FE} are called self-bias. Self-bias tends to make the collector current independent of the variability in a particular transistor type.

Fig. 2 shows three forms of self-bias. In **Fig. 2(a)**, the bias resistor is connected to the collector. An increase in collector current decreases collector voltage, and the bias current falls, which decreases collector current. This negative feedback tends to stabilize the operating conditions of the transistor. Unfortunately, the negative feedback also applies to AC variations and reduces the gain.

The negative AC feedback can be eliminated by splitting the bias resistor R1 into two parts and bypassing their junction for the frequency of interest as shown in **Fig. 2(b)**. The reactance of the bypass capacitor should be low compared to the parallel resistance of the two resistors. $X_C < (R1a^{-1} + R1b^{-1})^{-1}$.

In **Fig. 2(c)**, when the collector load is a low DC resistance primary of a transformer, the low DC resistance doesn't offer a significant change in DC voltage with changes in collector current. Dropping the collector voltage with a bypassed resistor can produce a meaningful change in collector voltage. The DC voltage at the collector should be half the supply voltage to allow maximum output voltage swing. Since the voltage at the resistor is bypassed, the voltage doesn't change with signal and it can be fed back to the base without degeneration.

Another way of obtaining self-bias is shown in **Fig. 3(a)**. A resistor R_E in the emitter raises the emitter voltage E_E to $I_C \times R_E$ and the base voltage raises accordingly. The voltage divider in the base produces the base voltage of E_E + 0.6 V and provides the desired bias current.

For example, if the emitter current is 10 mA and R_E is 200 Ω, E_E is 2 volts and the base is 2.6 volts. When the supply is 12 volts, the bias resistor must be

(12 - 2.6)/0.1 mA = 94 k. The voltage across R_E varies with the input and causes degeneration unless R_E is bypassed.

The capacitor used to bypass R_E must have a reactance low compared to the parallel combination of R_E and the resistance seen looking into the emitter r_e. The data sheets typically do not list a value for r_e, but it is only a few ohms. Therefore, the bypass capacitance must be quite large, typically in the range of 100 µF, to bypass 300 Hz.

Biasing of an emitter-follower is similar to biasing a stage with unbypassed emitter self-bias. An emitter-follower is shown in **Fig. 3(b)**. In an emitter-follower, the output is taken from the emitter instead of the collector. The emitter follower is characterized by a high input resistance, low output resistance, 0° phase shift, near unity gain, and excellent linearity. The good linearity and stable operating point arises from the 100% negative feedback provided by the unbypassed emitter. The bias can be obtained as shown in **5(a)** or **5(b)**.

For example, if the output of an emitter follower is to be 2 volts peak-to-peak, the minimum emitter voltage must be greater than zero when the input is minimum, say, 0.5 V. The emitter voltage will then swing from 0.5 V minimum to 2.5 V maximum around a DC level of 1.5 V. The input must swing from 1.1 V to 3.1 V. When the emitter resistance is 50 Ω, the DC emitter current must swing from 10 mA to 50 mA with an average (DC) of 30 mA. Assuming h_{FE} is 100, bias must set the base at 1.5 V + 0.6 V = 2.1 V with base current of 0.3 mA.

If R2 is arbitrarily chosen as 10 k, the voltage across R2 will be 2.1 V and the current in it 0.21 mA. The current in R1 is $I_{R2} + I_B$, or 0.21 mA + 0.3 mA = 5.1 mA and the voltage across it will be 12 V - 2.1 V = 9.9 V. R1 then must be 19 k or approximately 20 k. The output impedance is r_e (a few ohms). The load seen by the input signal is $h_{FE}R_E$, 100 x 50 = 5 k, in parallel with the bias network $(10\ k^{-1} + 20\ k^{-1} + 5\ k^{-1})^{-1}$, or about 2.8 k.

Biasing FETs is even easier than biasing BJTs, because FETs are voltage-controlled. It is more like biasing a tube. (If you're familiar with tubes.) A wag once said a tube is an N-channel depletion mode JFET with a light in it to tell you when it's good. That's a fair analogy, but there is a major difference. In a depletion mode JFET, the drain and source are relative — they can be interchanged without any change in operation. You can't do that with a tube. In the JFET, the most negative terminal is the gate. The other two terminals are drain and source, but which is which doesn't make any difference. The most positive one becomes the drain and the other one becomes the source.

In a depletion mode device, the drain current is maximum when the gate-to-source voltage V_{GS} is zero. In an N-channel device, current flows into the gate when the gate is positive with respect to the source, like a grid current in a tube. A reverse-biased gate current is in the range of nanoamps, compared to microamps of contact current in tubes.

The same biasing schemes are used with JFETs that are used with tubes. Like tubes, fixed bias needs a negative supply, which may be an inconvenience, but source bias, akin to cathode bias, is most appropriate. A resistance R_S in the source, as shown in **Fig. 4(a)**, produces a voltage that raises the source potential and makes the gate effectively more negative. The drain current I_D, which is the same as the source current, produces a source voltage I_DR_S. The gate must be returned to the most negative potential.

Of course, P-channel devices use negative voltages instead of positive voltages. But otherwise they act the same.

The source voltage produces negative feedback that applies to AC as well as DC current. Bypassing the source resistor eliminates the AC variations. The bypass capacitor's reactance should be lower than the parallel combination of $1/Y_{fs}$ (equivalent to $1/g_m$) and R_S at the lowest frequency of concern. Y_{fs} is typically in the range of 2000 µmhos. When the g_m is 2000 µmhos, the resistance seen looking into the source is 500 Ω, and a 1 µF can be used to bypass 300 Hz.

The drain current vs. drain voltage curves, analogous to a tube's E_p/I_p curves, show how the current responds to V_{GS}. Drain current is essentially constant like a pentode when drain voltage is greater than pinch-off. Pinch-off is approximately V_{off}, the gate source voltage needed to reduce drain current to zero. For short channel devices, a construction characteristic not mentioned in the data sheets, pinch-off is about twice V_{off}.

It's worth noting that g_m varies with drain current and is maximum at V_{GS} = 0 V. A characteristic g_{fso}, g_{fs} with gate voltage zero, is often given in data sheets, but it is seldom realizable because the N-channel gate is usually biased negative with respect to the source and consequently I_D is less than I_{DSS}.

Enhancement mode MOSFETs are a bit different from depletion mode devices. N-channel enhancement mode devices are cut off when V_{GS} is 0 V and conduct when the gate is positive with respect to the source. The gates of these devices are insulated and do not draw current when they are positive. These devices are usually characterized for use as switches but they can be biased to operate in a linear fashion.

For example, the VN2222LL, a small N-channel enhancement mode MOSFET, is linear when the gate is about 4 V positive and the signal levels are kept small. The transistor starts to conduct with V_{GS} (gate to source voltage) of about +3 volts. The drain current is 1.5 A when V_{GS} is about +10 V. When used as a switch, V_{GS} is normally held at zero and the switching voltage raises the gate above 3 V. The drain-to-source resistance is typically

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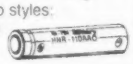

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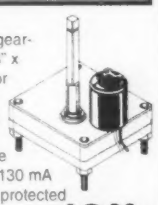

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only a few ohms when the gate is 10 V or more positive. Some large die MOSFETs have R_{DS} of less than 0.02 Ω, and rival mechanical relays for low contact resistance after millions of operations.

Biasing for linear operation at 4 V only requires a voltage divider of 470 k and 1 meg from 12 V. All of the biasing schemes applicable to BJTs can be used with enhancement mode MOSFETs without concern for base current.

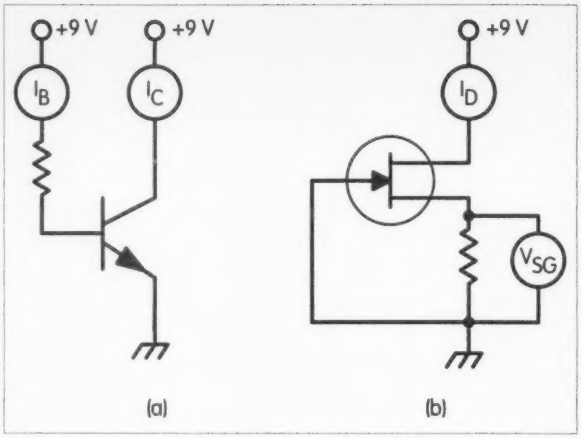

Fig. 5. (a) A simple test circuit finds h_{FE} of a BJT. (b) A test circuit for finding V_{GS} and I_{DSS} of a FET.

If your requirements fall outside the box, you can bias the device to suit your particular needs. While the data sheets don't always have the data you want, some simple tests can usually generate the information you need.

Fig. 5(a) shows how to determine the h_{FE} of a BJT and **Fig. 5(b)** can answer the question of what bias voltage is needed for a FET to produce the I_D you want. A calculator is a great help in easing the calculations, but the measurements and calculations are simple.

The h_{FE} of a BJT can be found with the test circuit shown in **Fig. 5(a)**. The current in the base and the collector current are measured and h_{FE} is simply I_C/I_B. With h_{FE} known, the bias current required for any quiescent collector current can be calculated, $I_C = h_{FE}I_B$.

Finding the bias conditions for a depletion mode JFET are a bit more involved. **Fig. 5(b)** shows the test circuit for an FET. A known resistor in the range of 10 k or 20 k is in the source of a depletion mode JFET. The collector current I_{DSS} is measured with the resistor shorted and collector current I_D is measured with the resistor in place. The voltage V_{GS} across the source resistor is measured when the drain current is I_D.

The process for finding the relationship between I_D and V_{GS} is as follows: (1) Measure the drain current I_{DSS} with the source resistor shorted. (2) Remove the short. Measure the drain current I_D and the voltage V_{GS} across the source resistor. (3) With I_{DSS}, I_D, and V_{GS} determined, V_{off} can be calculated with the following equations.

$$I_D = I_{DSS}(1 - V_{GS}/V_{off})^2$$

where I_{DSS} is the drain current when V_{GS} is zero and V_{off} is the voltage needed to reduce drain current to zero. Rewriting this to solve for V_{GS} and V_{off} yields:

$$V_{GS}/V_{off} = 1 - \sqrt{(I_D/I_{DSS})}$$

$$V_{off} = V_{GS}/[1 - \sqrt{(I_D/I_{DSS})}]$$

With V_{off} and I_{DSS} known, I_D for various values of V_{GS} can be calculated with the first equation.

While you have the calculator warmed up, it is just a step away for finding the g_m and gain. Gain is g_m x R_L. R_L is the drain load and g_m is:

$$g_m = 2/(V_{GS} - V_{off}) = [2/\sqrt{(I_D I_{DDS})}]/V_{off}$$

Biasing of transistors is not difficult, even though the calculations to find the starting point may be a chore. Just keep in mind that BJTs are current-controlled. That is, the collector current is controlled by the base current. The resistance looking into the base is low. FETs are voltage-controlled. The drain current is controlled by the gate-source voltage. The resistance looking into the gate is essentially infinite. 73

Henry Falkner ZL1AAN
8 Kapai Road, Devonport
Auckland 1309
New Zealand

Kiwi TV — Pt. 1

ATV 23cm FM Receiver

New Zealand–style.

Even though this system may not be too practical for USA hams, sometimes it's interesting to follow a project along in somebody else's shoes. Here's one such case.

All I ever wanted to do in amateur television was to watch the ATV repeater, on channel 39 at 615.25 MHz. This 10 W repeater has an amateur allocation in the middle of our UHF commercial TV band.

But now I have started a TV construction project, all because of this guy Grant Taylor ZL1WTT.

He wanted to use frequency modulation for its noise immunity and its capture effect—the strongest signal always completely swamps a weaker signal. He wanted to provide stereo sound, yet the whole project needed to be assembled from affordable parts, so that the cost of any single item would not act as a deterrent. Surplus parts should be used where possible.

The drawback with this approach is that such a project cannot be engineered for mass distribution overseas. Also, many of the overseas designs use components that are too hard to get in New Zealand. We have to design with components that are locally available. Even so, some parts for the FM transmitter are disappearing.

So, I will give details of the Auckland VHF Group ATV 23cm FM receiver, as an inspiration for any project you might come up with yourself. I should also note that although we are using the European PAL system for receiving color TV, this receiver is perfectly suitable for the American NTSC system. What comes out of it as composite video is simply what goes

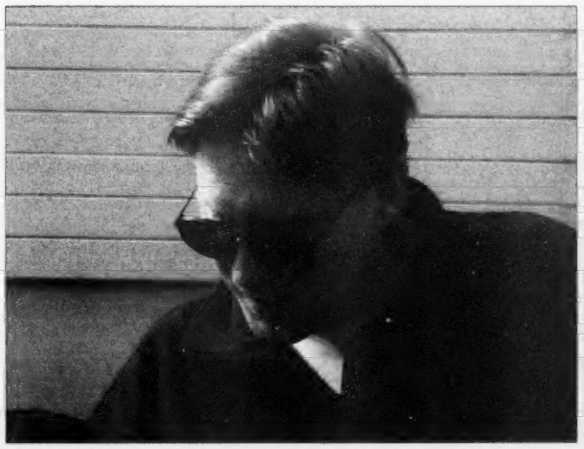

Photo A. *Grant Taylor ZL1WTT designed and built the first FM amateur television system in New Zealand.*

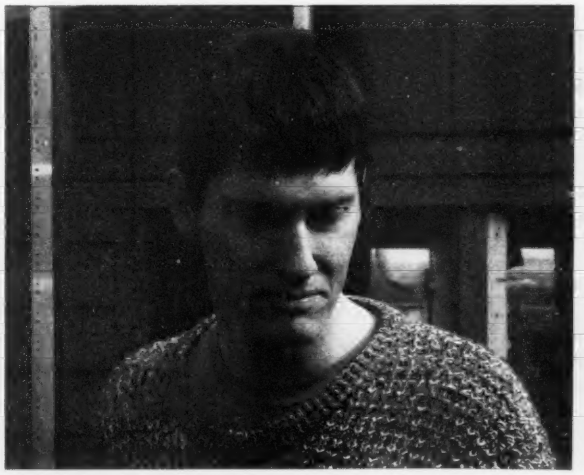

Photo B. *Ian Pople ZL1VFO further developed the receiver.*

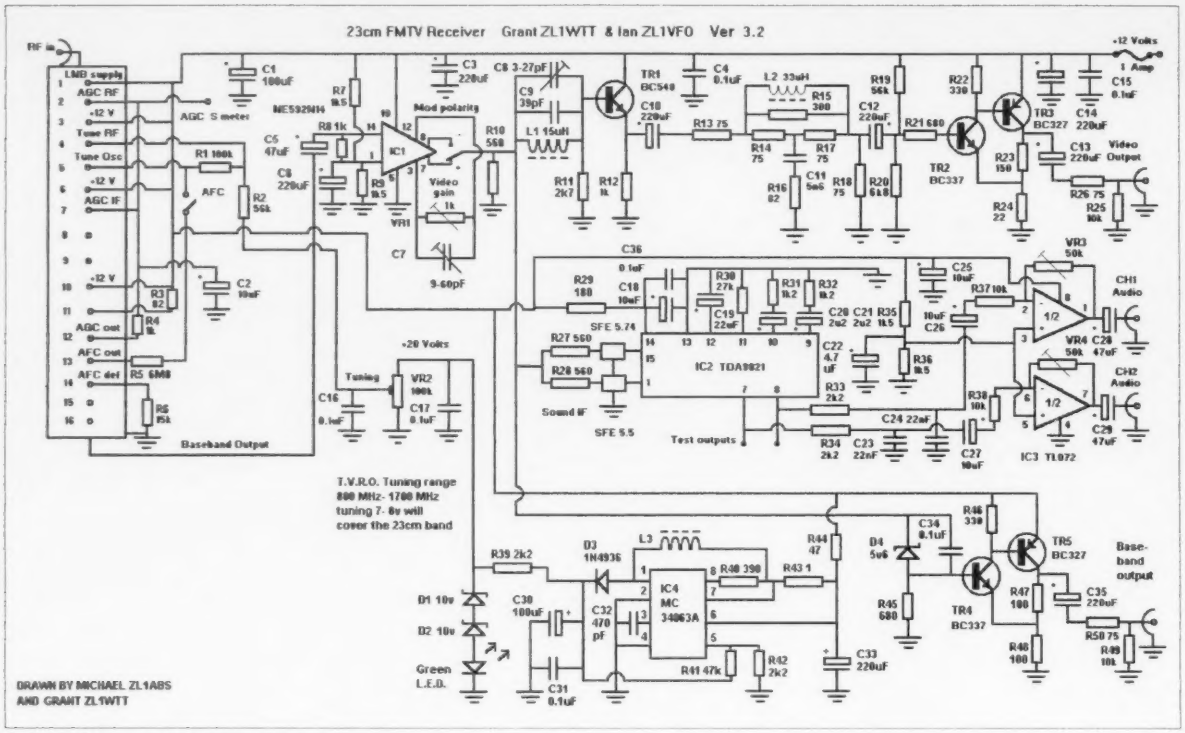

Fig. 1. Schematic for 23cm FMTV receiver.

into it as frequency-modulated ultra high frequencies at 1.28 GHz.

Grant made prototypes of the receiver and the transmitter, and did extensive tests, particularly with Wayne Griffin ZL1UKJ. Ian Pople ZL1VFO further developed the receiver, and this is the version I will describe.

The most complex part of the receiver is the analog satellite tuner, obtained surplus from Britain for less than $15 US. It has a separate RF and demodulator section. In the demodulator section, Grant increases the Phase Locked Loop time constant with an RC filter. This rolls off the high frequencies, and so reduces the bandwidth of the resulting video band, which is called the baseband from here on.

Grant demonstrated a 30 W transmission by Ralph Sanson ZL1TBG

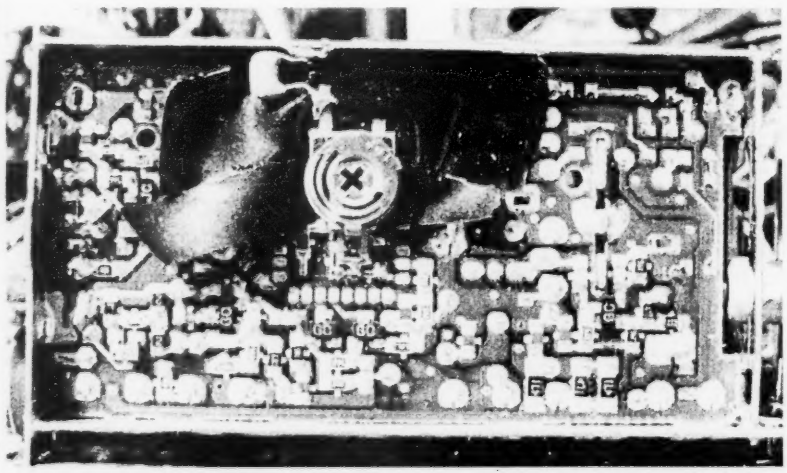

***Photo C.** A filter added to this analog satellite receiver IF module reduces picture noise.*

The impressive **IC-756 Pro** covers HF plus 6 meters. The high resolution 5 inch TFT color display provides more operating information than ever, including a spectrum scope. The 32 bit floating point DSP provides crisp, clear reception with 41 built-in filters. The "Pro" is *the* choice for serious DXers and contesters.

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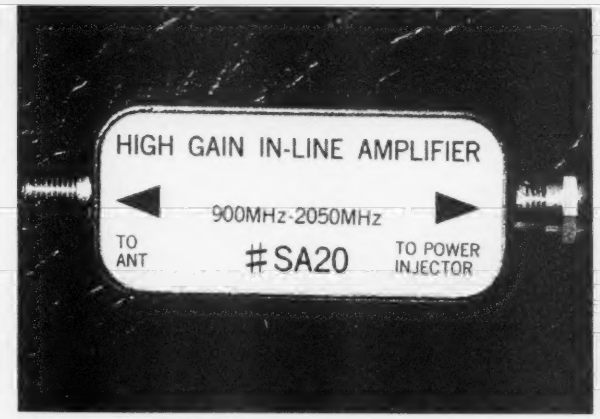

***Photo D.** A masthead amplifier sold for the satellite TV market is used.*

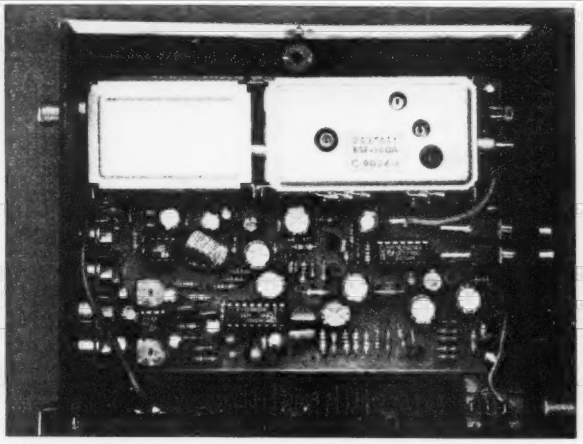

***Photo E.** The author's version.*

from 68 km away. The modification improved the receive quality from quite noisy to nearly full quieting.

The board uses a single layer of foil, without coating. Solder bridges are possible, but the builders are generally technicians who can rectify their own mistakes.

Since the output from the satellite tuner covers a frequency range of from 50 Hz to 10 MHz, wire lead components can be used for the rest of the receiver. The tuner output is amplified in an NE592 video amplifier chip, and provision is made to change the modulation polarity externally. The signal is filtered and further amplified to produce composite video suitable for the AV input of a standard PAL television receiver.

The two sound carriers, at 5.742 and 5.5 MHz, are extracted with ceramic filters from the baseband and demodulated in a TDA9821 chip. This is a German A2 sound demodulator. Since the sound is transmitted in two separate subcarriers, no stereo decoding is necessary. A dual op amp (TLO72) provides line-out volume for the two sound channels.

There is a separate unfiltered baseband output provided, allowing for retransmission of the received signal complete with sound.

The whole receiver needs a regulated supply of 13.8 volts at 1 amp. The satellite tuner is very susceptible to induced hum. I use a locally made switch-mode power supply, rated at 3 amps continuous, which gives me no interference pattern on the TV.

Tuning this receiver, however, calls for 20 volts. It is provided by another switch-mode power supply on the receiver board. It employs an MC34063 chip, a 1N4936 diode, and a custom-made coil. These three components came from wrecked cell phones. A multi-gang potentiometer allows uncritical manual tuning.

This receiver does need a masthead amplifier. Shown here is a # SA20 high-gain in-line amplifier covering 900 to 2050 MHz. Grant says, "This can be obtained from your local satellite supplier. It also helps to use a GaAsfet preamp on the front of the line amp."

Michael Sheffield ZL1ABS can supply photos and drawings of the whole project on e-mail, via [zl1abs@xtra.co.nz].

He also says that loop yagi kit sets for the 23cm band can be obtained from Directive Systems, RR #1, Box 282, Dixon Road, Lebanon ME 04027 USA; tel. (207) 658-7758; fax (207) 658-4337; e-mail: [sales@directive-systems.com]. Their Web page is at: [http://www.directivesystems.com/antenna.html].

My receiver will be my first test instrument for the transmitter yet to be started. Grant tuned it up for me. "You can congratulate yourself," he said. "This is the first built-up kit that worked first time I switched it on."

Thanks very much to Grant Taylor ZL1WTT for his assistance with this article. 73

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8 Kapai Road, Devonport
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Kiwi TV — Pt. 2

ATV Exciter

Latest addition to the Kiwi 23cm project.

The successfully completed 23cm receiver became a test instrument for a 23cm transmitter. Several transmitter PC boards are distributed by Wayne Griffin ZL1UJK, P.O. Box 28-300, Remuera, Auckland 1136, New Zealand. The essential one is the exciter board.

Grant Taylor ZL1WTT (Photo A, Pt. 1) had started with a free-running oscillator design from the British Amateur Television Club. He added a modulator, dual varicap tuning, and a prescaler for phase-locked-loop control. Wayne Griffin ZL1UJK did much of the circuit board layout.

The exciter, shown on the right half of the circuit diagram, is capable of producing a microwave signal typically between 1200 and 1300 MHz video directly from a camera, and two sound carriers for stereo transmission, derived from the German stereo broadcast concept.

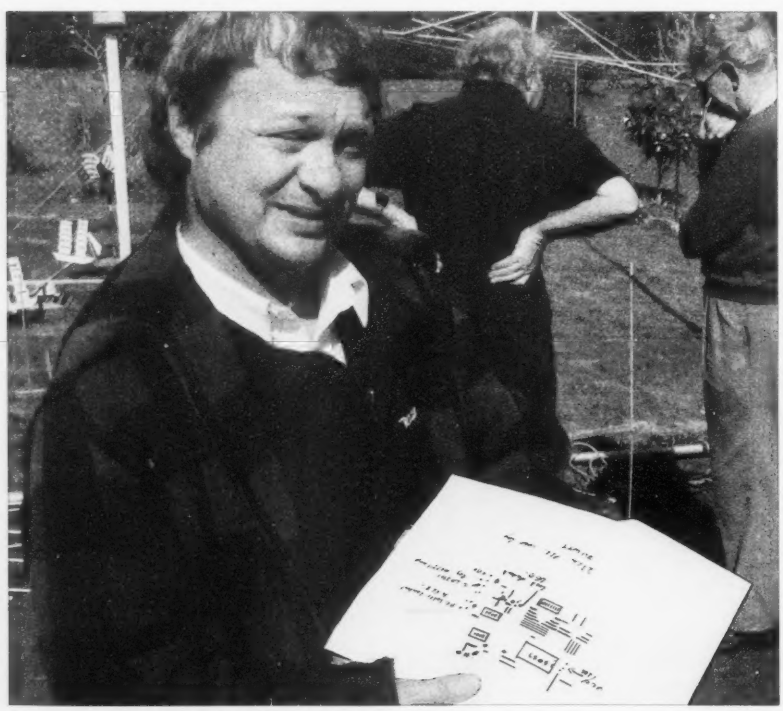

Photo A. Wayne Griffin ZL1UJK.

The modulator

A video camera can be directly connected to the filtered input of the NE592N-14 modulator chip by Philips. The filter shown provides PAL pre-emphasis. Sound has to be modulated first. For stereo, we use 5.5 MHz and 5.74 MHz subcarriers in New Zealand. The two preset potentiometers connected to pins 3-4 and 11-12 of the NE592N-14 chip provide video gain, and high frequency boost if needed. The preset on pin 7 or 8 controls modulation linearity. This part of the circuit handles frequencies below 10 MHz.

The exciter

Surface mount devices are used when available. The 23cm oscillator uses a bipolar BFR91 transistor in common base configuration, two coils, three biasing resistors, and a microstrip.

Varicap diode VC2 tunes the oscillator via the microstrip, manually by means of the preset VR4, or with an external phase-locked-loop board (PLL). The oscillator supply voltage is one of the parameters controlling the tuning range. The 78L08 regulator with the yellow LED provides 9.6 volts. Coil L3 is a choke, stopping microwave frequencies at that point.

Diode VC1 varies the tuned frequency within a range less than 10 MHz, which is the frequency modulation we require. Again, choke L2 stops microwaves from appearing at the modulator chip.

The two varicap diodes, DC-isolated by a 4.7 pF capacitor, keep the deviation reasonably constant over the tuning range of the microwave oscillator. The deviation is the amount by which the modulating frequency varies.

A second microstrip is loosely coupled to a buffer transistor, which is another BFR91, but this time in common-emitter configuration. It feeds a predriver stage. In the diagram, the predriver is an ERA5 IC.

Manual tuning is provided. But phase-locked-loop tuning is desirable for precision. It also permits transmitter switching, and adding a numerical frequency display. Both the PLL board and the frequency display are on separate boards. In fact, I have yet to construct them.

Grant Taylor ZL1WTT has included a divide-by-256 prescaler on the exciter board. The SAB6456 chip, from Philips, is being discontinued. RADIO SPARES lists, in Britain and here, an alternative prescaler suitable for microwave frequencies.

The prescaler output is buffered by a BC549, which has high gain. At the transistor collector, tracking of the tuning can be observed on a frequency meter and an oscilloscope, within a range that these instruments can handle. The prescaler output frequency varies typically between 4.5 to 5.3 MHz, which is easy to shunt to an external PLL board. For microwaves, any length of coaxial cable is more of an attenuator than a conductor.

Continued on page 28

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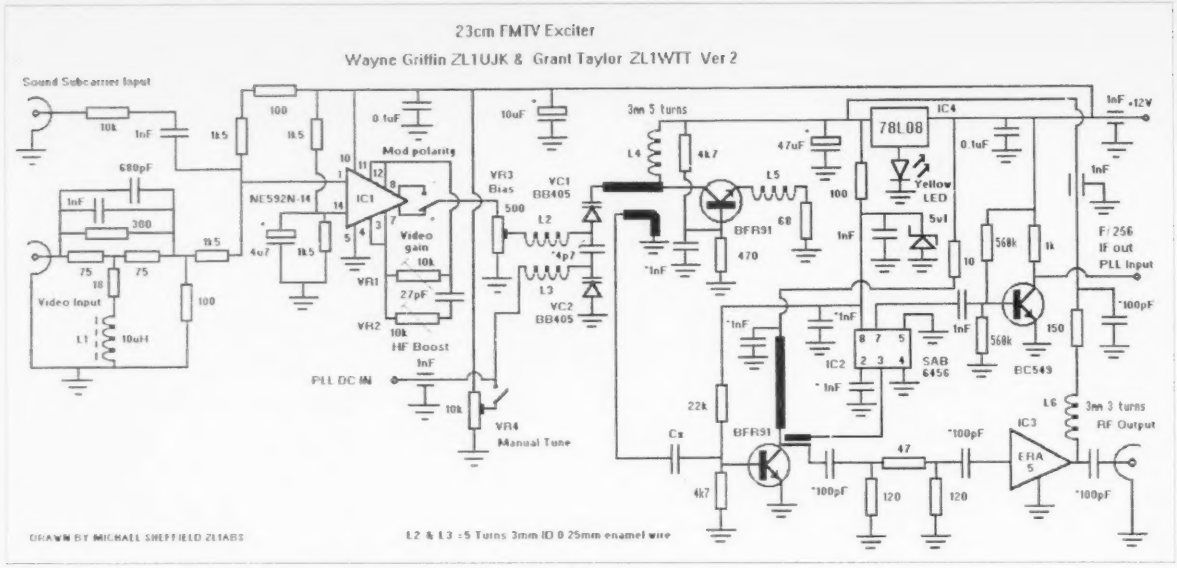

Fig. 1. Exciter board with video and sound modulator, a buffered 23cm oscillator, and x256 prescaler.

ATV Exciter

continued from page 27

Construction

Again, Grant Taylor ZL1WTT, tells me, I am the first one to get the exciter board going without him having to troubleshoot it. He says that the problems he sees are mistakes in the choice and placements of components, and construction technique.

Faults I had to rectify during testing were the wrong polarity of the electrolytic capacitor at pin 14, and not linking pins 3-4 and 11-12, at the NE592 chip.

The 75 and 300 ohm resistors in the PAL pre-emphasis (to the left), I could only obtain at a surplus store.

I used a 78L06 regulator, a blue LED, and a 100 ohm resistor to get a 9.6 volt supply for the oscillator. I used a BB833 varicap tuning diode for VC2.

This gives a tuning range of 1180 to 1360 MHz, with constant deviation and good linearity. Position of varicap diode VC1, a BB405 as specified, shifts the tuning range up or down (center of schematic).

The coils are not critical. Oscillator coil L5 is 1.5 turns of the tail of the 68 ohm emitter resistor, 3mm (1/8 inch) in diameter. The board layout requires that one of the biasing resistors has leads. Short tails are essential to minimize unwanted stray capacitance and instability.

The SAB6456 prescaler chip is designed for up to 1000 MHz (1 GHz). It is persuaded to work beyond 1.3 GHz by trimming its pins and mounting it prone on the board. I also put in pins to link the topside groundtrack and the bottom, plain side of the double-sided board.

Continued on page 57

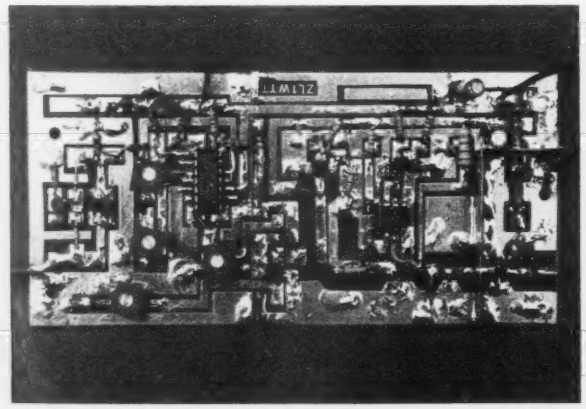

***Photo B.** This photo shows two metal screens between modulator, oscillator/buffer, and predriver. I made them 1 inch (2.5cm) high. The presets are sealed types. Open types will work, but they may become intermittent.*

***Photo C.** Trombone player Jane Hart from the folk band "Bantam at the Opera," at the Auckland Folk Festival.*

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Vaya Con (Ra)Dios

The radio amateurs of Spain — part 3: Madrid and Valencia

When I prepared my Spanish trip, besides my extended correspondence with Xavier EA3ALV, the editor of the Spanish CQ *magazine, I also wrote to U.R.E., the Radio Amateur Association of Spain, asking their cooperation in finding amateurs I could visit. In the beginning our collaboration was slow, but still I decided to go to Madrid to see them and some local hams.*

I also wrote to His Majesty Juan Carlos, the king of Spain, known to us as EAØJC, asking for a chance to visit and photograph him in his radio shack. I received an answer from one of his aides saying that an interview could not be arranged due to the busy agenda of His Majesty. I wrote again asking, as a second choice, for a photograph and some facts about HM's radio amateur activity. I received a second answer saying, "Be sure, I will do my best to find a gap in the schedule of HM the King"; however, the letter arrived after I left already for Spain. I believe that if I had signed my letter as "George Pataki, Count of Transylvania" or given as an alternative residence the New York Governor's office in Albany, I would have had a better chance.

Nevertheless, I have obtained from other sources a photograph of EAØJC at his radio station and his QSL card (**Photo A**). Many amateurs have worked EAØJC, but the vast majority have contacted the second operator, José, and, after his retirement, Isaias. I also found out that Margarita de Borbon y Borbon de Zurita, the sister of HM the King, is EA4AOR, and I even saw one of her QSL cards.

I also exchanged some E-mails with Isi EA4DO (**Photo B**) whom I met in 1970 during my first visit to Madrid. At that time a very young boy, Isi was the second operator at his father's station, also EA4DO.

From Barcelona, I took an early morning train to Madrid. Not knowing that on the same route are different types of trains, with different prices, it happened that I took the most expensive one, and for a first class ticket I paid 8,300 pesetas, about $56. With another train, on 2nd class, I would have paid only 4,900 pesetas, about $33. I could not notice much difference between the trains except that the faster they go, making fewer stops, the more expensive they are.

At every major railway station, at the information office, you can get a computer printout with all the trains going to your destination, with times of departure and arrival, type of train (which determines the cost of the ticket), etc. Also, in every major city there are one or more tourist information offices. One is usually at the railway station, where maps and various useful facts can be obtained, like a list of reasonably priced hotels and hostels, points of interest etc.

In Madrid, Juan, U.R.E.'s administrative secretary, was waiting for me. He took me to their headquarters, in a spacious four-story building. I was surprised to find out that U.R.E. has only 12 paid employees and only one of them, a Novice, has a radio amateur license. Four of these people work in the QSL bureau, sorting cards, and one is handling the packing and mailing;

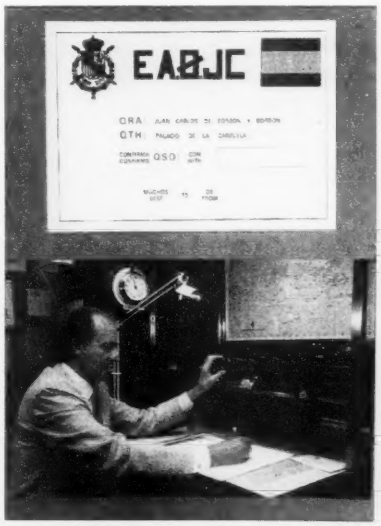

Photo A. *QSL card of His Majesty Juan Carlos EAØJC.*

Photo B. *The author first met Isi EA4DO in 1970.*

Photo C. *Leopoldo EA4GT is a retired electronics specialist.*

thus only seven are doing administrative and organizational work. However, it seems that they are doing a good job.

U.R.E.'s general secretary is Angel EA1QF. He lives about 200 miles from Madrid and he comes there only when necessary. Angel was licensed in 1976, and is a computer and communications specialist. He is a DXer and is on Honor Roll #1, missing only Scarborough and North Korea.

He is an award hunter and was active from several Spanish islands. In October 1998 Angel participated in the TJ2RSF expedition. He collects radio amateur pins, so if you go to U.R.E., take some pins with you.

U.R.E.'s president for the past 12 years has been Gonzalo EA1RF, who lives in Orense, Galicia, quite far from Madrid. He is a great talker. I saw him talking on the telephone nonstop for about 10 minutes, without giving the guy on the other end a chance to say a single word.

U.R.E. has 16,500 members out of a total of 60,000 licensed amateurs; however, there are 271,000 CBers in the country. It is interesting that the province of Madrid, which includes the capital city (the largest city in the country), has 1,921 class A amateurs, while in Barcelona province there are 2,700 class A hams.

The maximum allowable power for class A is 800 W, but I saw many amplifiers capable of delivering 2–3 kW PEP.

At the U.R.E. headquarters, there are four operating positions for EA4URE: HF, VHF-UHF, satellites, etc. On the roof, at 48 feet from street level, they have three towers. The tallest one, a 32-footer, has a 7-element yagi for 10-15-20-40 meters, a vertical for 2 meters and 70cm, and a 9-element vertically polarized yagi for 70cm. On a 19-footer, there are two yagis with crossed elements for 2 meters and 70cm, used for satellite communications, and a wideband discone. On a third tower, also a 19-footer, there is a log periodic for 2 meters, a 13-element yagi for 2 meters, a 21-element yagi for 70cm, and a couple more experimental antennas.

The QSL service, both incoming and outgoing, is free for members.

U.R.E. publishes *Radioaficionados;* a monthly magazine resembling *CQ* published in the US, with more color photos but fewer pages. The coordinator, which is like a managing editor, is Juan, the administrative secretary.

U.R.E. organizes national contests and is sponsoring several awards like EADX100, TPEA, ESPANA, 100EACW, CIA, TTLOC, and Locator EA. U.R.E.'s Web page is at [http://www.ure.es] and their E-mail is [ure@ure.es].

Years ago when I visited Spain, they had a socialist government. Coming from "socialist" Romania, I was very curious how this system worked in Western Europe. In Eastern Europe socialism was an economic disaster; nothing worked properly, people were

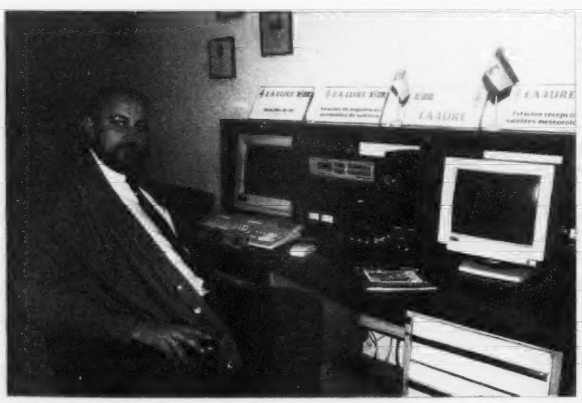

Photo D. *José EA4BPJ was first licensed in 1981.*

Photo E. *DXCC Honor Roller Xavier EA4AV is an avid DXer and sometime contester.*

unhappy, but could not do or say anything. In Spain, however, going from city to city I saw prosperity, stores full of merchandise, freedom of expression, to travel, to do business, etc. Houses, banks, farms, factories, etc., were in private hands, and people were working for themselves and were satisfied. It was very confusing to me. Finally, one day, during sightseeing, I entered into a dingy little eatery looking for the men's room. I found it, but it was filthy and stinky; it was just like the public toilets in Eastern Europe. Eureka, I said, I found socialism, the kind I knew from home.

Later, I found a cheap hostel close to Gran Via for 3,200 a night, with the bathroom and shower at the end of the hall, but the location was convenient. I stayed there two nights.

In a restaurant a patron is complaining that the meat is very small. The waiter tells him:

"You will be surprised to see how long it takes to chew it!"

Once, I asked a man wearing dark glasses and carrying a white stick, who was selling lottery tickets, a job usually performed by people with handicaps, in which direction lay Puerta del Sol. The man not only indicated the direction, but gave me very detailed instructions on how to get there. I wonder if he really was sightless …

Juan from U.R.E. arranged a meeting with Isi EA4DO, whom I had not seen for 29 years, and with Alan GW3INW, who was doing research on the communications equipment used in Spain during the Civil War. I had already seen some of his article on this subject in the *Spanish CQ* magazine.

We went to Majadahonda, about 10 miles from Madrid, to see Isi's station, EA4DO. Licensed in 1964, Isi is a pharmacist testing additives for the food industry. Both his parents were radio amateurs; his father Isidoro EA4DO was president of U.R.E. from 1960 to 1965.

Isi's tower is a 70-footer; it carries a 7-element yagi for 10-15-20 meters, and a 3-element yagi for 40 meters, both from KLM. He works the WARC band with the antenna tuner. Isi also has two inverted V antennas, one for 40, the other for 80 meters. He is on Honor Roll #1, and has the 7BDXCC, 5BWAS, 5BWAZ, 5BEUROPA, 5BASIA, etc.

His most important activity started in 1991 — doing research on the history of amateur radio in Spain. He even works on his doctoral dissertation on this very same subject. He has published several articles in the *Spanish CQ;* U.R.E.'s *Radioaficionados,* and the *R.C.A. of Argentina.* Isi has compiled a rich archive with data on the pioneer Spanish hams: photographs, QSL cards, magazines, diplomas, awards, various documents. He has created a display of these items and old communications equipment, tubes, parts, test instruments, all related to early amateur radio activity in Spain. Seeing his display, which occupies a large room in his house, was quite interesting and educational; meeting Isi EA4DO again after 29 years was a pleasure. I believe we should not wait another 29 years till the next meeting, so I have penciled him into my calendar for the year 2025.

Madrid, the capital city, is full of bureaucrats employed in various offices.

A foreigner found a government building closed in the afternoon and asked the watchman: "Here, the employees don't work in the afternoon?"

"They don't work too much in the

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Photo F. *Julio EA4BM is a retired military translator, first licensed in 1935.*

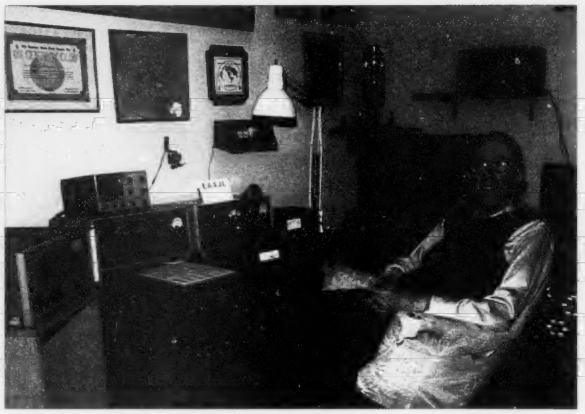

Photo G. *José EA4JL is a vintage equipment aficionado.*

morning either, but in the afternoon they just don't come in!"

The national pastime in Spain is soccer, called football. Devoted fans will do anything to attend the games.

In some government offices notes are posted: "Employees planning to attend funerals of their closest and most beloved family members are required to inform their superiors at least one day before any championship game. Thank you."

I met Leopoldo EA4GT (**Photo C**), a retired electronics specialist, in front of my hostel; I was wearing my cap with name and callsign. He took me to his house in Pozuelo de Alarcon, six miles from Madrid. He has a 33-foot tower with a 3-element TH3-MK3 yagi for 10-15-20 meters, a trapped inverted V for 40 and 80 meters, and a double dipole for 12 and 17 meters. For rigs, Leopoldo is using a TS-870 and a TS-930S with a 1 kW homemade amplifier and a homemade transmatch, both with vacuum variable condensers. For 2 meters, he has a TM-221A. Leo is a builder; his shack is full of his projects. He has many awards like the 7BDXCC, 5BWAS, 5BWAZ, etc., and is on Honor Roll #1. His photo was featured on the cover of the *Spanish CQ* magazine. He is a hunter, and his house is full of trophies. Leo is doing computer logging as well as the paper logging required by regulations. He has a nice QSL card.

Leopoldo drove me to U.R.E., where I met Angel EA1QF, the general secretary, and Gonzalo EA1RF, U.R.E.'s president. Both serve as volunteers, and several amateurs operate the headquarters' station EA4URE.

One of the hams I met there, Delfino EA4BOD, has had an interesting life. In 1937, he was taken from an orphanage to the Soviet Union where he went to school, grew up, got married, had children, and stayed till 1975, when he returned to Spain. He operated from Antarctica as EDØBOD when he worked there with a scientific research team.

At the radio station I also met José EA4BPJ (**Photo D**), a computer specialist licensed in 1981. José is a DXer, with about 300 entities worked for his DXCC; he is the chief operator at EA4URE and president of the radio club at U.R.E.'s Madrid branch. His wife Susana is EB4FSE, and his brother Sergio is EB4FRS.

I saw Felipe EA4UR at one of the four operating positions of the station. He was working them like in a contest — fast and many.

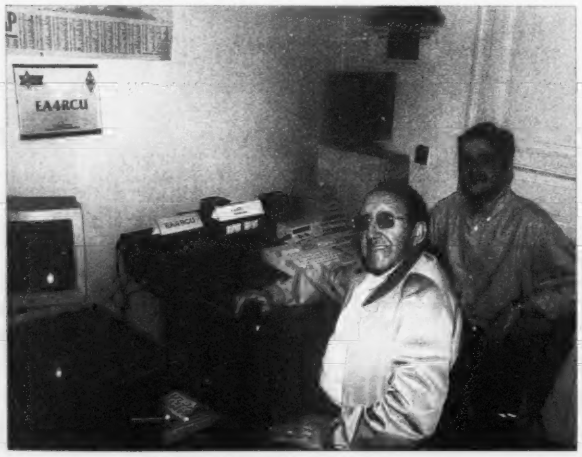

Photo H. *Placido EA4KU and Pablo EA4JW showed off the EA4RCU club station in Madrid.*

Photo I. *Jorge EA4EO's impressive station is completely self-designed and -built.*

I also operated the station on 20 meter SSB using the special call EG50URE, commemorating the 50th anniversary of U.R.E. In 1949, after World War II, amateur radio in Spain was again authorized. Even with unusually bad propagation, I worked about two dozen stations. The highlight was working my friend Leo YO2BM from my hometown of Timisoara, with Shalom 4Z4BS and Ludwig DL5MHQ, both originally from Romania. So there were four stations in four countries, on two continents, all talking Romanian.

At U.R.E. I met Francisco EA4AHK, president of Radio Amateurs Without Frontiers, a nongovernmental organization founded in Madrid in 1995. The organization is running 40 telecommunications projects with teams of doctors and missionaries in Chad, Western Sahara, Cameroon, Tanzania, Congo, Congo Brazzaville, Rwanda, Togo, Mali, Honduras, Nicaragua, Albania, etc., with calls SØ1RSF, TJ2RSF, EA4RSF, TT8FC, 5H3FH, TZ6ASN, etc. For emergencies, they used the 14.128 MHz frequency, at 15.00 UTC.

I heard about José, the brave DXpeditioner, who went on a safari in an African country with a local hunter.

"These are marks made by a big lion; I will follow them to see where he went," said the hunter.

"I will go in the opposite direction," said José, the brave DXpeditioner, "to see where he came from!"

Another time, this happened:

A traveling salesman is offering a very poor man some luggage.

"What should I do with them?"

"Well, you should pack your clothes when you travel."

"And I should sit naked on the train?" asks the very poor man.

I visited Luis EA4OX, a retired airline pilot for Iberian Airlines, and his wife Ana EA4RO, a former stewardess, both licensed in 1974. They have a Cushcraft R5 vertical antenna and a TS-440S. In their second home in El Escorial, about 30 miles from Madrid, for low frequencies they use a Cushcraft R7 with a Heathkit HW-101, and for 2 meters and 70cm they have a vertical Ringo and a TM-231A. Both have nice QSL cards and work only on SSB, mostly with Spanish stations. They have a family of hams: Son Luis Jr. is EA4AID, and daughter Carmen EA4YV.

I went to see Xavier EA4AV (**Photo E**), a computer engineer licensed in 1980. On his 48-foot tower, installed on the roof at 64 feet from the ground, Xavier has a Hy-Gain Explorer 14–type of 3-element yagi for 10-15-20 meters, a trapped inverted V for 40 and 80 meters, another dipole for 80 and 160 meters, and a vertical for 2 meters. Xavier has two identical TS-930S transceivers and an Ameritron AL-80B amplifier. On 2 meters, he is using an IC-251. Xavier EA4AV is a DXer and sometime contester. He is DXCC Honor Roll, and has 7BDXCC, 5BWAS, 5BWAZ, 5BEADX100, and many more prestigious awards. He has QSL cards and has worked EAØJC with the first operator, HM Juan Carlos, the king.

I visited Julio EA4BM (**Photo F**), a retired translator for the military, licensed in 1935. He is using a W3DZZ antenna for 10 to 80 meters, an FT-767GX, and an IC-751. He is a DXer, worked over 200 entities on CW and SSB. Julio used to build his equipment, but now he prefers factory-made gear. He has QSL cards, just the kind I like, with big, wide letters for the callsign. He had a QSO with EAØJC — the second operator, not the King.

I went to see José EA4JL (**Photo G**), a mechanical engineer licensed in 1966. José likes vintage equipment and has quite a little collection. He uses Collins, with an Alpha 374 amplifier. His antenna farm has a 3-element yagi for 10-15-20 meters, from Hy-Gain; a vertical for 10-15-20-40-80 meters; an inverted V for 40 and 80 meters; and a wire dipole for 12 and 17 meters. Like every respectable well-to-do Spaniard, José has a second house in Navacerrada, 25 miles from Madrid. There he has another station with a Signal One, and, having more room, he has installed a homemade 4-element quad for 10-15-20 meters; a 4-element monobander yagi for 20 meters from Wilson; a 5-element tribander yagi for 10-15-20 meters from Hy-Gain; inverted Vs for 40, 80, and 160 meters; and 3 beverages, each

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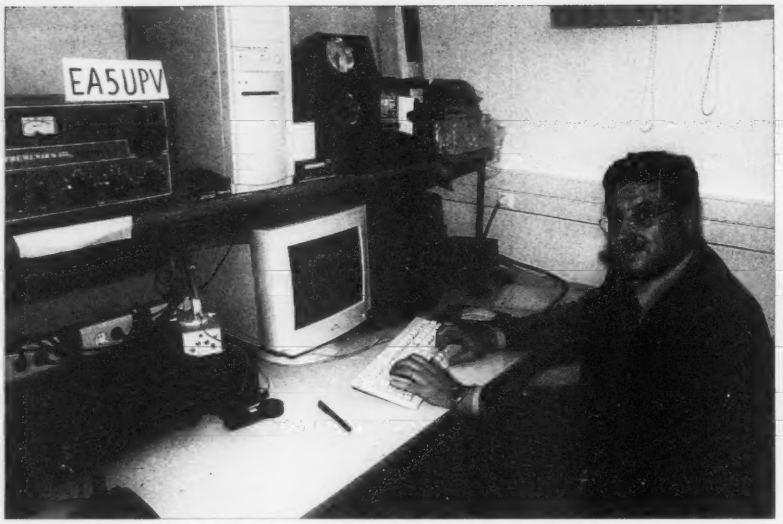

Photo J. *Eusebio EA5CA fired up the EA5UPV club station in Valencia.*

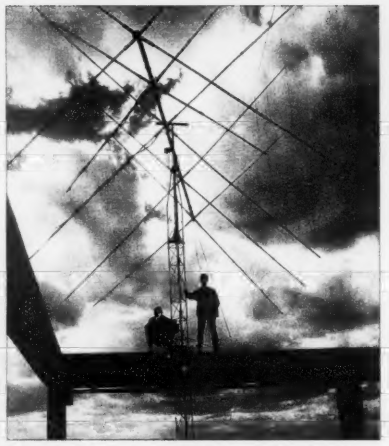

Photo K. *Javier EA5AUB and Henrique EA5FIB are not just ops at the Polytechnic University of Valencia's EA5UPV — they also take care of the antennas.*

640 feet long, and in different directions. José EA4JL is on Honor Roll #1, has the 5BDXCC, WAZ and many other awards. His son Jorge EA4LH, a mechanical engineer, made DXCC on satellites.

Next I visited the radio club of U.R.E.'s Madrid section, where the president is José EA4BPJ. They have a small station, EA4RCU, but with an enthusiastic group of amateurs. They usually come there in the evening to leave and pick up their QSLs and talk about what they worked and what they missed. I met there Javier EA4TK, an electrician who has over 300 entities for his DXCC, working only SSB; José EC4WZ, a security guard, who works some contests and has over 100 entities; Carlos EA4BDO, a DXer and award chaser with over 250 entities, who works SSB and SSTV; José EA4ECF, a building administrator, who operates SSB and CW; Placido EA4KU, a retired building constructor with 225 DX entities worked mainly on CW; and Pablo EA4JW, a product manager in a clothing factory, who worked over 200 entities for his DXCC, mainly on SSB (**Photo H**).

The last one visited in Madrid was Jorge EA4EO (**Photo I**), a very unusual amateur. Licensed in 1953, he is retired from NASA's Madrid Deep Space Tracking Station, where he was a supervisor in the test equipment laboratory. Everything he has and uses, and I counted 20 pieces of equipment, with more on the workbench, was designed and built by him. He has published several technical articles in ham magazines, and one of the pieces of gear he built was featured on the cover of the *Spanish CQ* magazine. His antenna is an original variation of the Comudipole antenna, which is a coaxial, multiband dipole working on the 10-12-15-17-20-40 meter bands. Jorge has a nice QSL card. His uncle Enrique is EA4EP, one cousin is Carlos EA4KC, another cousin is Kike EA4ASA.

Not having too much to do in Madrid, I decided to go to Valencia,

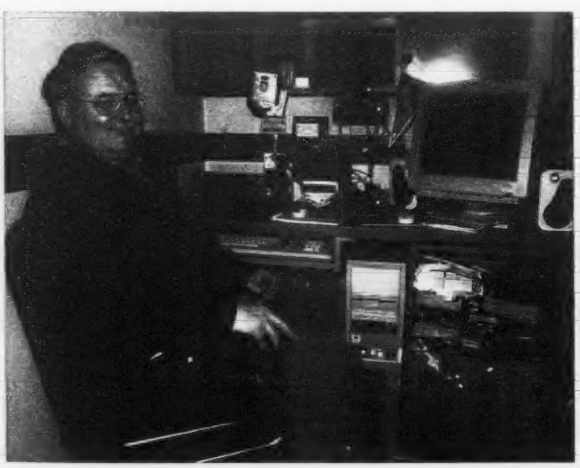

Photo L. *José EA5GKT has what sounds like a challenging job: mechanic in a car wash.*

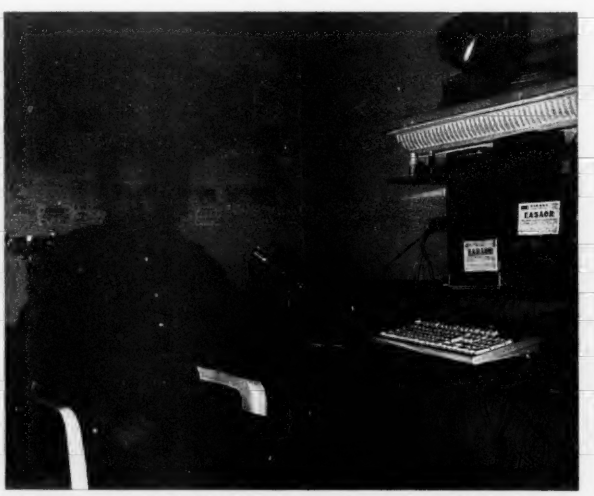

Photo M. *Enrique EA5AOR went on an Isla de Buda DXpedition ...*

which was highly recommended by Eddie EA3NY. I had learned my lesson: I bought a second-class ticket on the cheapest train I found leaving early morning. It stopped in many places, but I got to Valencia in the same time the first class passengers did.

The radio amateurs of Valencia

The last big city on my tour of Spain was Valencia. It was recommended by Eduard EA3NY and it followed Madrid. Eduard called up Pepe EA5KB, told him about my project, and asked him to arrange some visits.

At the Valencia railway station, Eusebio EA5CA (**Photo J**) was waiting for me. Pepe EA5KB, who was busy preparing an IOTA convention in Alicante and hosting Yuki JI6KVR who came for the convention, sent him.

First I had to find a place to sleep. Right in front of the railway station was a rundown hotel, but it was high-priced.

"Why is this so expensive?"

"Because it offers free entertainment all day long."

"What kind of entertainment?"

"You can watch right from your window all the people who missed their train!"

Eusebio EA5CA, licensed in 1979, runs his computer-aided design company and creates very sophisticated programs. He has a 38-foot tower on the roof, 80 feet from ground. For antennas, he is using a C4XL type of 9-element yagi for 10-12-15-17-20-40 meters from Force 12, a rotatable rigid dipole for 80 meters, a delta loop for 80 and another one for 160 meters, and a Diamond vertical for 2 meters and 70 cm. Eusebio has plenty of rigs: an FT-1000D, an FT-1000MP, an IC-970H, an IC-756, a 2.5 kW Ameritron AL-1500 amplifier. For 2 meters, a 1 kW Henry 2002A amplifier. Eusebio's English is excellent. He works SSB and SSTV, is a contester and occasional builder, but most of all he is a DXer with over 310 DX entities. He has worked EAØJC and has nice QSL cards in various color combinations.

I got used to hearing about the second house many Spanish amateurs have, with second stations, big antennas, and amplifiers. Eusebio also has a second house in Naquera, and a third one in Denia with a complete station for DXing and contesting.

Eusebio took me to the radio club of the Polytechnic University of Valencia, which has several rooms and big antennas, and is where the EA5UPV station is located. On a large and very high roof, I saw a quad, a log periodic, and several yagi antennas. The station has several rigs; in one room is an IC-756 with an Ulvin Tremendus III amplifier capable of delivering 5 kW, and for 2 meters and 70cm, an IC-821. In a second room, I saw a TS-870, an IC-821, and a second Ulvin amplifier, identical with the first one. The third room has an FT-920 and an IC-756. The director of the radio club is Fausto EA5AFC, a professor of electronics. Javier EA5AUB and Henrique EA5FIB (**Photo K**), are operators, and they take care of the antennas as well. Besides the regular modes of operation, in this club experiments on color ATV on the 1.2 GHz band also are conducted. I did not see any QSL cards.

Eusebio also took me to Jesus EA5DOQ, a psychologist licensed in 1979. Jesus has a 45-foot tower on a 128-foot-high roof with an X-9–type Cushcraft, which is a 10-element (ten, yes ten, it is not a misprint) yagi for 10-15-20-40 meters, an inverted V for 80 meters, and a vertical for 2 meters. He has a couple of rigs, among them an IC-756 and an Ameritron 1 kW AL-80B amplifier. Jesus has a nice QSL card. He operates SSB, CW, RTTY, SSTV, packet, DX cluster, and contests, and is a DXer with 315 entities. With his antenna and equipment, it would be a shame to have anything less than that.

Finally, we met Pepe EA5KB, who came with Yuki JI6KVR. We had lunch together, and then we went to Pepe's house. An industrial engineer licensed in 1984, Pepe is married to Ana EA5CY, licensed in 1987, a post office employee. Both are contesters and DXers, and members in EA DX Club, Pepe with 333 entities and Ana with 205. They have a 4-element yagi for 10-15-20 meters, a TS-440S, and a TL-922 2 kW amplifier. They do computer logging, have DX cluster,

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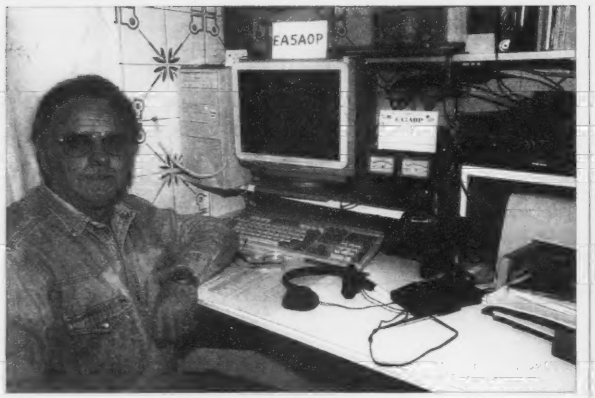

Photo N. ... As did Bernardo EA5AOP.

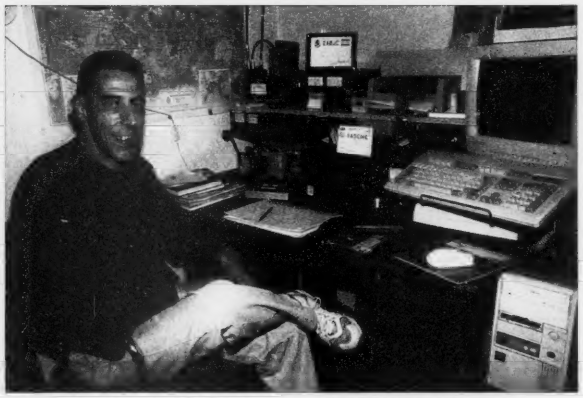

***Photo O.** Enrique EA5CMC has worked EAØJC twice.*

work on SSB and RTTY. Pepe is an award and island chaser with 729 IOTA islands worked; he has operated from 12 islands. He worked EAØJC's second operator, José. Both have QSL cards. Pepe's E-mail is: [ea5kb@ctv.es].

Next I saw Paco EA5BHK, an electronics technician licensed in 1979. His wife Paquita EB5EGV was licensed in 1984 and is working in commerce. The antennas are: a 4-element yagi for 10-15-20 meters, a 2-element yagi for 40 meters, both from KLM, and a dipole for 40 and 80 meters. They have an FT-1000 with an FL-2100Z, and an Ulvin Tremendus III amplifier. Paco is a member of Lynx DX Group and the EA DX Club. He is a DXer with 316 entities, and has lots of awards like the 5BDXCC, 5BTPEA for working all Spanish provinces on 5 bands, WAS, WAZ, WAE, DIE (the Spanish Islands award; he has worked over 600 Spanish islands), and others. Paco is not only an island chaser but he also has operated from 12 Spanish islands. Both have nice QSL cards. Paco EA5BHK has worked EAØJC, second operator José.

Fernando EA5AT, licensed in 1983, is selling wood products for building construction. He has a 38-foot tower on the roof 90 feet from the ground. His antennas are a 3-element yagi for 10-15-20 meters with an extra element for 40 meters, dipoles for 80 and 160 meters, and a vertical for 2 meters and 70cm. He uses a TS-940S with a 500 W FL-2100B amplifier, and an IC-251A. Fernando is a DXer, having worked every existing entity except for Bhutan and North Korea. He is also a member of the prestigious Lynx DX Group, having over 1800 points for the Lynx award. He is on the DXCC Honor Roll, WPX Honor Roll, IOTA Honor Roll with 825 islands, has 7BDXCC, WAZ (ITU) Supreme Award #1 plaque, WABA plaque (Antarctic Bases), 5BWAS, etc. Needless to say, he is an award chaser and he does QSL.

Jean-Marie EA5HE, a bus driver licensed in 1983, was the next for us to see. On his 22-foot tower installed on the roof, 93 feet from ground, he has a TX6DXX-type 6-element yagi for 10-15-20 meters, a wire dipole for 40 and 80 meters, and a vertical for 2 meters. He is using a TS-440S. He is an occasional contester, and a DXer, having worked every entity except North Korea — not bad for using only 100 W. Jean-Marie has QSL cards.

Fernando EA5AT and Jean-Marie EA5HE took me to the radio club of U.R.E.'s local branch, where the radio station EA5URV is located. The club claims 440 members and has several rooms: a very large one for meetings and classes, one for the station, and another one for the Internet. In the big room, you can buy food and soft drinks. The members come on Thursdays from 6 p.m. to about midnight. The antenna is a Hy-Gain 3-element yagi for 10-15-20 meters, a dipole for 40 and 80 meters, and a vertical for 2 meters and 70cm. The rig is a TS-930S. They operate SSB and CW, have packet, DX cluster, and a nice color photo QSL card. I met the club secretary, Manuel EA5ELF, an auto mechanic, and the president, Manolo EA5FSK, a retired Guardia Civil sergeant.

About 22 miles from Valencia is the city of Carlet. There I met Paco EA5ADT, who was licensed in 1989 and works in the Ford automobile factory. He has a rotatable rigid dipole for 10-15-20-40 meters, and another rotatable rigid dipole for 12 and 17 meters, an inverted V for 40 and 80 meters, and a vertical for 2 meters. His rigs are a TS-120S, a TS-140S, and for 2 meters he is using a TS-255E. Paco works SSB, SSTV, sometimes on satellites, has 290 DX entities, and uses a nice QSL card. He has also worked EAØJC, second operator José.

Also in Carlet I visited José EA5GKT (**Photo L**), a mechanic in a car wash, licensed in 1989. His 29-foot tower stands on the roof 96 feet from the ground and supports a 3-element yagi for 10-15-20 meters, an inverted V for 40 and 80 meters, and a vertical for 2 meters. It seems that many Spanish amateurs prefer this kind of antenna setup. José has a TS-440S, has 120 entities for his DXCC, works on SSB, CW, SSTV, and 2 meter packet. José also has a nice QSL card.

In Carlet, there is an active radio club that organizes island DXpeditions like the one to Isla de Buda with operators Manuel EA5GLT, Enrique EA5AOR (**Photo M**), Bernardo EA5AOP (**Photo N**), and Ricardo EC5AHM.

Two members of a radio club were not getting along, and the others tried to pacify them. One of them stretches out his hand, saying: "Let's be friends again, and I wish you all the things you wish for me!"

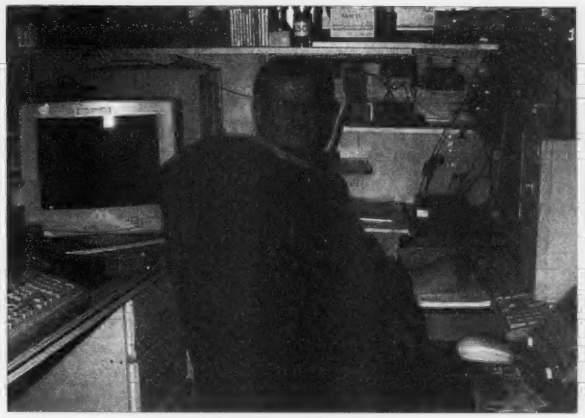

Photo P. *Augusto EA5CTU has a 45-foot tower on top of a 96-foot-high roof.*

Photo Q. *José EA5EE has three HF transceivers, three HTs, and four computers.*

The other gets angry and yells: "See, he's starting again!"

Another time, a ham buys some coax cable and says to the salesman:

"It seems that the yardstick you are using is shorter than the other one."

"That is true, but is also much thicker!"

In Alcudia, right near Carlet, I saw the station of Enrique EA5AOR, a plumber licensed in 1993, who, working mostly SSB, already has accumulated 290 DX entities. Enrique has a Cushcraft A-3S 3-element yagi for 10-15-20 meters, and a vertical Diamond X-200 for 2 meters and 70cm. He is a member of the EA DX Club and has two kinds of nice QSL cards: On one he is pictured in his bicycle-racing outfit with his racing machine. He does computer logging with the KINGWIN program made by EA7ABW. He is an award hunter and an island chaser; he operated from several Spanish islands for the IOTA program. From his station, I had a QSO with my friend Bandi HA5CQ, a DXer and active net controller. I had met Bandi personally in Budapest and I was pleased to hear a familiar voice. Enrique was driving me around from city to city, from one ham to another.

Enrique took me to Alginet to see Bernardo EA5AOP, a housepainter licensed in 1995. Bernardo has a multiband wire dipole for 15-20-40-80 meters, and a vertical for 2 meters. For the low bands, he is using a TS-140S, and for 2 meters he has a FT-212RH. He works SSB, some SSTV, is an island chaser and has 120 DX entities. His QSL card has a nice color photograph.

In Algemesi, Enrique EA5AOR took me to another Enrique, this one is EA5CMC (**Photo O**), a machine operator in an orange-packing factory, licensed in 1977. His 48-foot tower sits on the roof 64 feet from ground and supports a Cushcraft 3-element yagi for 10-15-20 meters with a driven element having also 40 meters, as well as some VHF and UHF yagis. Enrique has a TS-850S and an FT-2400 for 2 meters. He operates on SSB and SSTV, has about 200 entities for his DXCC, and is an IOTA island chaser. He worked EAØJC twice; once the first operator was HM Juan Carlos, and then the second time, it was operator José. Enrique is a member of the EA DX Club and he also has a nice QSL card.

The next amateur to visit was Augusto EA5CTU (**Photo P**) in Alzira. A building construction foreman, he was licensed in 1987. His 45-foot-high tower sits on a roof 96 feet from the ground and supports a 3-element yagi for 10-15-20 meters made in Spain by Tagra, a rotatable rigid dipole for 10-15-20-40 meters, a 17-element yagi for 2 meters and a 21-element yagi for 70cm, both horizontally polarized, and a vertical for 2 meters. Augusto has a TS-940S, a TS-440S, a TS-140S, an Ameritron AL-811 1 kW amplifier, and two US military surplus 2 kW amplifiers. For VHF-UHF, he has an FT-736R and a TS-711E. He works SSB, SSTV, has packet, DX cluster, E-mail, and used to operate on satellites. He has 310 DX entities and a big bunch of awards. Augusto has two types of QSL cards. One of them has the motto: "Ser Espanol: Un orgullo. Ser Valenciano: Una gracia. Ser Radioaficionado: Un deber," which translates somehow into "To be Spanish, it's a pride. To be Valentian, it's a gratitude. To be a radio amateur, it's a necessity." Nice thoughts!

It is interesting that several hams just could not smile when I photographed them. One said: "I am serious person, I don't smile!" I was wondering what a serious person is doing when he is being tickled, but I did not try to find out.

The next amateur to visit was also in Alzira, spelled by some as Alcira. He was Julio EA5GHK, a police inspector licensed in 1985. He did not look at all like the Pink Panther but he was a real inspector — he showed me his badge. He has an H6-type of Butternut vertical, an IC-735 for low bands, and a DR-599 for 2 meters. Julio works SSB, does computer logging, is a DXer with over 200 entities, has over 400 awards, and 4–5 types of QSL cards. He worked the first operator, HM Juan Carlos EAØJC.

The last one in Alzira was Rodolfo EA5APH, a retired radio and TV serviceman, licensed in 1977. He has a vertical antenna for 10-15-20 meters, a dipole for 40 and 80 meters, and a vertical for 2 meters. His rig is an IC-735,

Continued on page 58

CALENDAR EVENTS

Listings are free of charge as space permits. Please send us your Calendar Event two months in advance of the issue you want it to appear in. For example, if you want it to appear in the March 2001 issue, we should receive it by January 31, 2001. Provide a clear, concise summary of the essential details about your Calendar Event.

JAN 20

ST. JOSEPH, MO The Missouri Valley ARC and Ray-Clay ARC will sponsor their 10th annual Northwest Missouri Winter Hamfest, 8 a.m.–3 p.m., January 20th, 2001. The event will take place at the Ramada Inn, I-29 and Frederick Ave. (exit 47 on I-29), in St. Joseph MO. Special room rates are available for Hamfest participants. Talk-in on 146.85 and 444.925. VE exams, major exhibitors, and flea market all indoors. Free parking. Admission is $2 each, or 3 for $5 in advance; $3 each, or 2 for $5 at the door. Pre-registration requests received after Jan. 5th will be held at the door. Swap tables are $10 each for the first two tables. Commercial exhibitors welcome, write for details: *Northwest Missouri Winter Hamfest, c/o Neal or Carlene Makawski WBOHNO/KAOIKS, 3704 Meadowoak Lane, St. Joseph MO 64503. Tel. (816) 279-3406; E-mail [nem3238@ccp.com].*

JAN 21

HAZEL PARK, MI Hazel Park ARC's 35th Annual Swap & Shop will be held at the Hazel Park High School, 23400 Hughes St., Hazel Park MI. Open to the public 8 a.m.–2 p.m. Plenty of free parking. General admission is $5 in advance or at the door. Tables $14; reservations for tables must be received with check. No reservations by phone. Talk-in on 146.64(–), the DART repeater. For more info about the swap, tickets or table reservations, mail to *HPARC, P.O. Box 368, Hazel Park MI 48030.*

JAN 28

CICERO, IL Wheaton Community Radio Amateurs' Midwinter Hamfest will be held 8 a.m.–1 p.m. at the Chicago Motor Speedway, 3301 S. Laramie, Cicero IL. Flea market tables, commercial booths, VE exams on site, free parking. Talk-in on 145.390. Tickets $5 in advance, $7 at the door. For further info call *(630) 545-9950, or E-mail [info@wheaton-hamfest.org].* Advance orders must be received by January 1st. Orders received after this date will be returned unprocessed. Make checks payable to W.C.R.A. and mail with a business size SASE to: *W.C.R.A., P.O. Box QSL, Wheaton IL 60189.*

DOVER, OH The Tusco ARC Hamfest will be held January 28th at Ohio National Guard Armory, 2800 North Wooster Ave., Dover OH 44622, 8 a.m.–1 p.m. Dealer setup at 6 a.m. Admission $3 donation at the door. Dealers admitted free. Tables $10 each. Food will be available on site and the restaurant next door opens at 7 a.m. For additional info and to reserve tables, contact *Gary Green KB8WFN, 32210 Norris Rd., Tippecanoe OH 44699. Tel. (740) 922-4454; E-mail [kb8wfn@tusco.net].*

FEB 5

SUN CITY, AZ An Amateur Radio Equipment Auction will be conducted at 7 p.m. by the West Valley ARC at St. Clement of Rome Catholic Church Social Hall, 15800 Del Webb Blvd., Sun City AZ, (1/2 mi. S of Bell Rd.). Free admission. The club keeps 10% on equipment sales. Talk-in on 147.30(+). Contact *Ron K6OP, (623) 546-5710; E-mail [ronk6op@juno.com].*

FEB 9–11

ORLANDO, FL The Orlando Hamcation Show and ARRL North Florida Section Convention will be held Friday, February 9th, noon to 8 p.m.; Saturday, February 10th, 9 a.m. to 5 p.m.; and Sunday, February 11th, 9 a.m. to 3 p.m. The Orlando ARC will sponsor this event at the Central Florida Fairgrounds, Rt. 50 Colonial Dr., 3 miles west of I-4. Special features include Guest Speaker Ed Petzolt K1LNC, the 1999 ARRL International Humanitarian Award winner. Forums: DX, satellite demos, Phase 3D, PSK-31, APRS. 150 commercial booths, 400 swap tables, the largest tailgate in the southeast, and RV camping with elect. and water, $16 per night. VE exams, must register in advance; call *Gil Lineberry at (407) 843-4122.* Register for the Foxhunt by 4 p.m. at the info booth. Admission $7 in advance or $9 at the gate. Talk-in on 146.760. Check the Web site for up to date info, [www.oarc.org/hamcat.html]. Contact *Ken Christenson, 5548 C Cinderlane Pky., Orlando FL 32808; (407) 291-2465; or [af4zi@juno.com].*

FEB 24

LA PORTE, IN The LPARC Cabin Fever Hamfest will be held Saturday, February 24th, at La Porte Civic Auditorium, 1001 Ridge St., La Porte IN, 7 a.m.–1 p.m. Chicago time. Admission $5, tables $10 ea. Talk-in on 146.52 and 146.61(-) PL 131.8. For info, contact *Neil Straub WZ9N, P.O. Box 30, La Porte IN 46352; tel. (219) 324-7525; E-mail [nstraub@niia.net].* Visit the Web page at *[www.geocities.com/k9jsi/].*

FEB 25

HICKSVILLE, NY The LIMARC Winterfest 2001 Electronics Hamfair and Flea Market will open at 9 a.m. for buyers, with doors opening at 8 a.m. for vendors. The event will be held at Levittown Hall, 201 Levittown Parkway, Hicksville NY. Tables are by advance reservation only; $20 if received by February 14th, $25 after. *Payable to LIMARC, P.O. Box 392, Levittown NY 11756.* Each reservation includes one 6 ft. table and admission for one person. General admission is $6, children under 12 admitted free if accompanied by a paying parent. For more info visit the LIMARC Web site at *[http://www.limarc.org],* or call the 24 hour info line at *(516) 520-9311.* Talk-in is on the 146.850 rptr., PL 136.5.

SPECIAL EVENTS, ETC.

NOW THROUGH FEB

SAN JOSE, CA Some members of "The Crystal Set Radio Club" [http://clubs.yahoo.com/clubs/thecrystalsetradioclub], a very active Yahoo! clubs on-line discussion group forum, are sponsoring a Crystal Radio Building Contest. This contest is now underway, and runs through February, 2001. The contest objective is to demonstrate innovation and craftsmanship in the design and construction of homemade crystal radios. The contest is open to everyone worldwide. There are two classes of entries, Master and General, and three categories of design: General, 100% Homebrew, and Free Style. A contest Web site has been set up where you can find the detailed rules and information at *[http://w3.one.net/~charlie/contest/].* A distinguished panel of judges has been assembled to judge the contest entries. Short biographical sketches are posted at the contest site. Each judge has had extensive experience in several areas of vintage radio and crystal set design and construction. Prizes, which have been donated by various individuals, include an unbuilt MRL-2 Crystal Radio kit, and a pair of vintage headphones. A FAQ page linked with the Building Contest site should answer most questions that might come up. It is updated as new questions come in. Hard copy information

Continued on page 59

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OSCAR-10 Antenna System	A look at the high end ...	K6CCC	OCT 36
Return of the Amazin' Hall Tree Vertical	For 40/30	K5CW	JUL 18
String Up the GPU 80	Compact transmitting antenna	G2BZQ	JUL 14
The Cap'n Crunch LOWFER Loop	Lightweight longwave antenna	G2BZQ	SEP 10
The Hybrid Vee	Improve the original Taylor Vee	KB5IAY	JUL 22
The Universal Loop	Covers from 55 kHz to 40 MHz	G2BZQ	JUL 10
Twinleads To Go	Emergency antennas for 2m and 70cm	W4JC	JUL 20
Circuits			
A BFO for Your SW Rx	With a $10 Ten-Tec kit.	W4PGI	NOV 22
Build This IP3 Test Set	Measure xcvr's intercept performance	N2DCH	NOV 10
Introducing the Perfective 1	A noninvasive current meter	Laughlin	DEC 37
Salvage Special: TV/VCR Tuner Receiver	Watch the neighbor's curb...	W6WTU	MAR 16
Windshield Auto-Wiper	An interesting approach ...	Sellen	SEP 57
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Announcing the Yingling ET-1	A new QRP classic.	W2UW	DEC 10
Build and Compare	Learn about receivers ...	KG4CUY	MAY 18
Electronics Bench for Dummies	A good bench is important	N2XS	JUN 18
Make Copies of This Article	Build a simple code buzzer.	W8DYF	APR 20
More than a Modem Monitor	Another great project.	W7RXV	DEC 16
Skinflint Lightning Arrestors	Great protection on the cheap	K8IHQ	DEC 30
Super-Simple 80m Fox	QRP rig, for dual-band foxboxes.	KØOV	NOV 24
The Care and Feeding of NiCds	Clever tips, plus a home-brew charger.	K9TRG	MAR 21
Try a Sensor Keyer	For almost pressure-free CW.	WB4TED	APR 28
Try This Tube-Type FM Transmitter	That's FM as in broadcast radio	Sellen	SEP 34
Tuner King Strikes Again	Part 1: Basic VHF/UHF signal source	W6WTU	MAY 24
Tuner King Strikes Again	Part 2: Basic VHF/UHF signal source	W6WTU	JUL 24
YOU Can Build the FoxFinder 80!	3.5 MHz ARDF.	WB8WFK	NOV 29
CW - Code			
Make Copies of This Article	Drop them off at your local school(s).	W8DYF	APR 20
Morse Code — The Once and Future Mode	Will you outlive it — or vice versa?	N1FN	APR 10
Really PIC Key, PIC Key	Memory functions for PIC keyer project	UY5DJ	AUG 10
The Long-Lost Art of Conversational CW	Know what to say.	WF6P	APR 18
Try a Sensor Keyer	For almost pressure-free CW.	WB4TED	APR 28
Digital Modes			
A Good Look at WinAPRS	Mark Sproul's shareware program	KE8YN/4	AUG 34
The Digital Port	RCKRtty	KB7NO	J/F 50
The Digital Port	From Feld-Hell to MT603 ...	KB7NO	MAR 52
The Digital Port	DigiPan program for PSK31.	KB7NO	APR 46
The Digital Port	RTTY on a Sound Card	KB7NO	MAY 44
The Digital Port	Timewave's DSP-599zx	KB7NO	JUN 46
The Digital Port	Inside MixW32	KB7NO	JUL 52
The Digital Port	Zakanaka	KB7NO	AUG 51
The Digital Port	DigiPan is as easy as PSK31 gets	KB7NO	SEP 51
The Digital Port	Work Wonders with WinWarbler 1.6.5	KB7NO	NOV 44
The Digital Port	More New Freeware!	KB7NO	DEC 44
DX			
The DX Forum	B'reshith — Beginnings	N6NR	MAR 54
The DX Forum	The Voice of DXers	N6NR	APR 53
The DX Forum	The DX Dynasty Entities List	N6NR	MAY 47
The DX Forum	Chesterfield, the Holy Land, and More	N6NR	JUN 42
The DX Forum	Phoenix and Clipperton	N6NR	JUL 43
The DX Forum	A smashing good book for DXers	N6NR	SEP 39
The DX Forum	DX4WIN Has PSK31 Functionality	N6NR	DEC 47
The DX Partyline Low Noise Wavecatcher	Great noise reduction loop.	N6NR	MAR 30
Editorials			
Never Say Die	Mea Culpa; The Changes	W2NSD/1	J/F 4

Never Say Die	Okay, 2000 is really here...	W2NSD/1	MAR 4
Never Say Die	It's Spring!; Things Are Looking Up!	W2NSD/1	APR 4
Never Say Die	5/5 Oh, Oh!; ARRL's New President	W2NSD/1	MAY 4
Never Say Die	Schools Get An F; The Icke Book	W2NSD/1	JUN 4
Never Say Die	Club Building; The Next Step	W2NSD/1	JUL 4
Never Say Die	Basing?; Russian Meltdown	W2NSD/1	AUG 4
Never Say Die	A Birthday Present; What You Can Do	W2NSD/1	SEP 4
Never Say Die	Anniversary; New Novice?	W2NSD/1	OCT 4
Never Say Die	Mired; 2020?	W2NSD/1	NOV 4
Never Say Die	Traffic Tickets; Executive Order	W2NSD/1	DEC 4
Education			
Adopt a School	More good tips on introducing the ARS	N7MGT	SEP 28
School's In!	Go on a "lecture circuit"	WA9PYH	SEP 24
Emergency Preparations			
On the Go	It's That Time of Year	KE8YN/4	JUL 41
On the Go	Now That You've Upgraded ...	KE8YN/4	AUG 48
On the Go	Murphy's Law and Disaster Services	KE8YN/4	OCT 43
On the Go	HR Responds to a *Real* Emergency!	KE8YN/4	DEC 53
Equipment			
Electronics Bench for Dummies	A good bench is important	N2XS	JUN 18
On the Go	Gregoire TR-2000 headset	KE8YN/4	MAY 57
Fiction			
The Finger	Help your DX buddies	K9AZG	APR 23
General Interest			
73's DX Dynasty Award	Current list of award winners	Staff	J/F 29
Angel Voices	An unusual beam tuning experience	KC6JGS	DEC 35
Buffalo Springs Lake Half-Ironman Triathlon	Ham PR at its best.	KC5VKB	J/F 14
Cold Fusion, Hot Speculation	For experimenters	W6HDM	AUG 28
Ham Ambassadors	Help capture would-be hams	WB6NOA	SEP 19
New Millennium Wish List	A budget-conscious guide...	K4WJ	J/F 10
On the Go	Justifying Our Existence	KE8YN/4	SEP 47
Rocky Road to a Great Radio Club	Interview w/ Jeff Seligman WA2VNT/7	WA6ITF	JUL 29
Time on My Hands	And things to do with it ...	W4PGI	AUG 56
Vaya Con (Ra)Dios	Part 1: Catalonia	WB2AQC	APR 30
Vaya Con (Ra)Dios	Part 2: Mallorca and Andorra	WB2AQC	AUG 19
You're So Vain	Vanity plates	AC3L	MAY 36
Mobile			
Ah, the Technomadic Life!	The Microship	N4RVE	JUN 10
A QRO Rig in a QRP Car	IC-706, meet Chevy Metro	WB8VGE	AUG 38
On the Go	10 Meter FM is Getting Hot!	KE8YN/4	J/F 39
On the Go	Promoting Mobile and Portable	KE8YN/4	MAR 46
On the Go	Installing Your Mobile Rig	KE8YN/4	APR 55
On the Go	Welcome to APRS	KE8YN/4	JUN 57
On the Go	Mobile HF Lessons From the Hamfest	KE8YN/4	NOV 47
New Products (by manufacturer)			
Alinco	"Clear" DJ-V5	Staff	MAY 48
Alinco	DM-330V Power Supply	Staff	JUN 48
Bird Electronic Corp.	Model 5000 THRULINE digital pwr mtr	Staff	JUN 48
Chaney Instrument Co.	Atomix Clox	Staff	OCT 48
Creative Services Software	LogWindows 3.06.50	Staff	MAR 48
Creative Services Software	Marine radio control software	Staff	JUN 48
Cutting Edge Enterprises	PowerPort VX-5 Radio Glove	Staff	MAY 48
Elecraft	K1 QRP Transceiver	Staff	OCT 48
Electrosoft	WinCw code sending program	Staff	JUL 48
Elenco Electronics, Inc.	SL-5 Soldering Station	Staff	MAY 48
Gordon West WB6NOA	New license manuals	Staff	JUL 48
Hamtronics	Year 2000 Catalog	Staff	MAR 48
LDG Electronics	AT-11P Autotuner	Staff	MAR 48
LLH Technology Publishing	Forrest Mims Circit Scrapbook I	Staff	JUN 48
LLH Technology Publishing	Forrest Mims Circuit Scrapbook II	Staff	JUL 48
MFJ Enterprises, Inc.	ATR-20 Antenna Tuner	Staff	OCT 48
MFJ Enterprises, Inc.	MFJ-134 transparent clock	Staff	NOV 48
MFJ Enterprises, Inc.	MFJ-269 SWR Analyzer	Staff	OCT 48
MFJ Enterprises, Inc.	MFJ-1436 RuffRider Tri-Bander	Staff	OCT 48
MFJ Enterprises, Inc.	MFJ-1709 foot switch	Staff	NOV 48

Morse Express	Finger Tappers™ Keys	Staff	JUN 48
Morse Express	Swedish Pump Key	Staff	OCT 48
Paddlette Co.	K-4 Iambic Keyer	Staff	JUL 48
Paddlette Co.	KP-1 and KP-3 mini keyer combo	Staff	MAR 48
Rippen WB6SZS	Ham Price Guide 2nd	Staff	MAY 48
Universal Radio	Catalog	Staff	JUL 48
Universal Radio	*Discover DX-ing*, 2nd ed. John Zondlo	Staff	OCT 48
Power Supplies			
Simple P.S. Add-Ons	Enhance your power supply project	Specht	NOV 55
The Care and Feeding of NiCds	Clever tips, plus a home-brew charger.	K9TRG	MAR 21
QRP			
Announcing the Yingling ET-1	A new QRP classic.	W2UW	DEC 10
QRP	The Lure of QRP	WB8VGE	J/F 47
QRP	Tending the (Antenna) Farm	WB8VGE	MAR 50
QRP	The Vectronics VEC1340K	WB8VGE	APR 45
QRP	The Jersey Fireball 40	WB8VGE	MAY 56
QRP	MFJ Cub QRP Transceiver	WB8VGE	JUL 55
QRP	Electricity at the Speed of Light	WB8VGE	AUG 50
QRP	HW-8 Notes + QRP PSU	WB8VGE	OCT 52
QRP	Loose Ends	WB8VGE	DEC 58
QRP with the OHR 500	Review of a five-band CW rig	ABØCD	MAY 23
When Less Is More	The excitement of QRP	N1FN	MAY 10
Radio Direction Finding, Fox Hunts			
Homing In	Foxhunting at Hamcon-99—and More	KØOV	J/F 53
Homing In	ARDF Takes Off in 2000	KØOV	APR 41
Homing In	T-Hunting for ELTs	KØOV	MAY 54
Homing In	RDF Tracks Critters and Bugs	KØOV	AUG 54
Homing In	Grunge Busters II — Intermod Patrol	KØOV	SEP 42
Homing In	USA Foxhunting Championships 2001	KØOV	OCT 44
Homing In	80m ARDF Comes to America	KØOV	NOV 38
Homing In	T-Hunting by the Bay	KØOV	DEC 54
Super-Simple 80m Fox	QRP rig, for dual-band foxboxes.	KØOV	NOV 24
YOU Can Build the FoxFinder 80!	3.5 MHz ARDF.	WB8WFK	NOV 29
Reprints			
Read All About It!	Part 2 of Techno-Trivia	K8JWR	J/F 26
Read All About It!	Part 3 of Techno-Trivia	K8JWR	MAY 27
Read All About It!	Part 4 from *The Hertzian Herald*	K8JWR	SEP 30
Reviews (by manufacturer)			
Alinco	Inside Alinco's DR-M03	KE8YN/4	J/F 18
Am-Com	Straight Talk about ClearSpeech	AA6JR	JUN 31
Comet	CA-UHV antennas	KE8YN/4	JUL 34
Dick Smith Electronics	Up on a Down Under Kit - DSE K-7204	W4QBU	SEP 37
Drake	Drake SW1 Receiver	W4PGI	NOV 20
Embedded Research	TICK-1 kit	AC4HF	APR 21
EMTECH	Another Look at the NW-40	K4CHE	MAY 38
Kenwood	TM-D700A, Part 1	KE8YN/4	MAY 14
Kenwood	TM-D700A, Part 2	KE8YN/4	JUN 38
LDG	DWM-4 digital wattmeter kit	AC4HF	MAY 30
Mark Sproul	WinAPRS shareware program	KE8YN/4	AUG 34
Oak Hills Research	QRP with the OHR 500	ABØCD	MAY 23
Reviews (by product)			
ClearSpeech speaker	Am-Com	AA6JR	JUN 31
DR-M03 Transceiver	Alinco	KE8YN/4	J/F 18
DSE K-7204/low ohms meter	Dick Smith Electronics	W4QBU	SEP 37
DWM-4 digital wattmeter kit	LDG: Wattmeter Winner	AC4HF	MAY 30
NW-40 QRP transceiver	EMTECH's QRP transceiver	K4CHE	MAY 38
SW1 shortwave receiver	73 Tests the Drake SW1 Receiver	W4PGI	NOV 20
OHR 500	5-band CW rig	ABØCD	MAY 23
TM-D700A dual-band transceiver	Kenwood TM-D700A, Part 1	KE8YN/4	MAY 14
TM-D700A dual-band transceiver	Part 2: A rig for all seasons	KE8YN/4	JUN 38
Satellite Operation, EME, Space			
Cruising for Satellites	This is the best of both worlds	W5ACM	OCT 22
From Russia, With Satellite	"The name is Brown, Jerry Brown"	R3/K5OE	OCT 27
Hamsats	You Can Make Hamsat Contacts *Now*	W5ACM	J/F 57
Hamsats	Contacting AO-27	W5ACM	MAR 42

Hamsats	Advanced AO-27 Techniques	W5ACM	APR 50
Hamsats	Your Home Sat Station	W5ACM	MAY 52
Hamsats	Field Day 2000	W5ACM	JUN 51
Hamsats	Digital Satellite Communications	W5ACM	JUL 50
Hamsats	Y2K Field Day Report	W5ACM	SEP 48
Hamsats Portable-Style	Portable rigs and antennas	W5ACM	OCT 50
Hamsats	If Your Xcvr Goes Brain-Dead	W5ACM	NOV 50
Low-Cost P3D Antenna Setup	Three antennas perfect for everybody	K5OE	OCT 17
Microwave P3D	Here's all you need to know.	GM4PLM	OCT 54
OSCAR-10 Antenna System	A look at the high end ...	K6CCC	OCT 36
Satellite Gateways	Time you tried one?	G3LDI	OCT 38
With Fingers Crossed	The latest on Phase 3-D	G3RWL	OCT 10
Test Equipment			
Add-On Digital Voltmeter	Strictly for those who love to build ...	KA8PHO	NOV 53
Build This IP3 Test Set	Measure xcvr's intercept performance	N2DCH	NOV 10
Junk Box Audio Test Generator	Easy to build and fun to use.	Sellen	J/F 22
Well, Not Exactly	Finer points about using your o'scope	K5CW	JUN 28
Tutorials			
Generating SSB	SSB has many advantages over AM	W2GOM/7	SEP 13
Inside Digital TV/VCR Tuners	Part 1: How to make them work.	W6WTU	SEP 54
Inside Digital TV/VCR Tuners	Part 2: Data transmitter for testing.	W6WTU	OCT 30
Inside Digital TV/VCR Tuners	Part 3: Data receiver for testing.	W6WTU	NOV 16
Inside Digital TV/VCR Tuners	Part 4: Testing and binary data format	W6WTU	DEC 25
Secrets of Transmission Lines, Part 6	The Smith Chart	KE2QJ	J/F 31
Secrets of Transmission Lines, Part 7	Impedance matching	KE2QJ	MAR 23
The Quest for Better Sounding Audio	Improve your on-the-air image...	K4TWJ	MAR 10
Updates			
All About Op Amps	AUG 1999 issue, page 24	W2GOM/7	NOV 6
VHF/UHF			
Above & Beyond	Noise and Its Amateur Implications	WB6IGP	J/F 44
Above & Beyond	Noise Figure Meters...	WB6IGP	MAR 39
Above & Beyond	Accessories for Our HTs	WB6IGP	MAY 41
Above & Beyond	Safe LED Optical Transceiver System	WB6IGP	JUN 54
Above & Beyond	LED Optical Transceiver System Pt 2	WB6IGP	JUL 38
Above & Beyond	LED Optical Transceiver System Pt 3	WB6IGP	AUG 44
Above & Beyond	The Joy of HTs ...	WB6IGP	SEP 45
For the Above and Beyond Crowd	RF modulator/detector	WA4WDL	AUG 30
OSCAR-10 Antenna System	A look at the high end ...	K6CCC	OCT 36

NEVER SAY DIE

continued from page 4

Hmm, and how interesting will the contacts be? Will you QSL yourself? For that matter, what proof will there be?

Loop Antennas

Joe Carr K4IPV has authored a 133-page 8.5- x 11-inch book which has everything and a half that you'll ever want to know about loop antennas. It covers desktop loops, yard-filling loops, and room-sized loops for the antenna-challenged. Loops for any band.

Sure enough, there on page 36 was the Bi-Square Loop antenna. That's the one Sam Harris W8UKS out in Cleveland used to work all around the world on 75m with his Collins 32V, running 120 watts input on AM. When I'd get on with my cool kilowatt and a dipole the guy Sam was talking with in South Africa would say, Let's standby, I hear a faint heterodyne, so someone may be wanting to join us.

The book is $20. If your ham store doesn't have it in stock you can get it from Universal Radio for $2 s/h, 6830 Americana Pkwy., Reynoldsburg OH 43068 [www.DXing.com].

A Basic Decision

There are three fundamentally different career paths for youngsters to pursue in life, and the education for each of these is quite different. Thus, schools (and colleges in particular) should decide for which path they are going to prepare their graduates.

Having been consulted by several college presidents, having interviewed a few more as part of my work with the Educational Subcommittee of the New Hampshire Economic Development Commission, and having read several shelves of books on education, I'm convinced that neither the public nor educators have considered this concept. And that's resulted in a massive waste of time and money for students, faculty, and schools.

The three career paths? One path is in preparing for a job. The second is preparing to own one's own business. And the third is in the arts, as a creator or a performer — like actors, playwrights, artists, musicians, composers, and so on.

There are many things all three career paths have in common, such as a need to be able to read and write, a knowledge of history, and basic math skills.

Business owners in high-tech fields will need to have a good background in math and physics. But from there it should be their personal interest which dictates whether they are going to specialize in electronics, computers, radio, chemistry, biology, and so on.

This is a particularly difficult time for school administrators who have the responsibility for planning ahead. The world changed enormously when the agricultural revolution

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Andy MacAllister W5ACM
14714 Knights Way Drive
Houston TX 77083

AMSAT 2000 Space Symposium

Nearly 200 satellite enthusiasts traveled to Portland ME for the AMSAT 2000 Space Symposium and General Meeting in late October. With the launch of Phase 3-D only weeks away, enthusiasm was high. Many of the presentations focused on the design, construction, launch campaign, and proposed use of Phase 3-D.

One delightful surprise was the release of an updated version of InstantTrack from Paul Williamson KB5MU. Although it is still DOS software, the new version (Rev. 1.50) is Y2K-compliant and, as before, screamingly fast on all PCs. You can get yours on-line via the AMSAT Web site [http://www.amsat.org].

Friday

The AMSAT 2000 Space Symposium and Annual Meeting began in earnest at 8:15 on the morning of Friday, October 27th, with introductory remarks from Symposium Chairman George Caswell, Sr. W1ME. Keith Baker KB1SF followed with an update on the proposed launch schedule for AMSAT's largest satellite ever, Phase 3-D. While AMSAT is involved in many projects, Phase 3-D represents the culmination of many years of dedicated effort by supporters worldwide. The October 2000 issue of *73 Amateur Radio Today* carried several articles dealing with ground station requirements and satellite specifications.

The first presentation of the symposium was a group effort from Dick Jansson WD4FAB, Lou McFadin W5DID, Dick Daniels W4PUJ, and B'dale Garbee KBØG. Dozens of pictures were shown from the early stages of the launch campaign in Kourou, French Guiana.

AMSAT volunteers from many of the participating global AMSAT groups have traveled to Kourou to take care of final integration and testing efforts prior to flight. Some of the pre-launch activities that were shown and described included transmitter testing, solar panel installation, and fueling. Anticipation and excitement was pervasive among the presenters and Symposium participants.

Ed Krome K9EK followed with his talk "Phase 3D: A Primer on High Frequency Operation." Ed discussed cost-effective methods of building hardware from kits to operate through the UHF and microwave transponders on the satellite. There are several sources of reasonably priced receive and transmit converters on the market including offerings from Down East Microwave [http://www.downeastmicrowave.com] and SSB Electronics USA [http://www.ssbusa.com]. Ed talked too long for the symposium organizers, but the audience never noticed.

Dominick "Dee" Interdonato NB2F addressed proposals for projects beyond Phase 3-D. His idea for Phase-5 included both orbiters and landers traveling to the moon and the planets. While the means to achieve such a program is currently beyond AMSAT, it was truly thought-provoking. How about an Amateur Radio Planetary Package (ARRP) as a "piggyback" payload on a NASA or European launch?

G. Gould Smith WA4SXM presented findings on his research into 9600-baud digital operations via satellite using several types of antennas. His results showed that most simple antennas, like omnidirectional "eggbeaters" yielded low digital downlink efficiencies compared to small yagi antennas, even when using good preamplifiers at the antenna.

Every year we see more projects from university groups. Three students from the Thayer School of Engineering at Dartmouth College captivated the group with their paper "Modular Nanosatellites as Amateur Radio Communication Platforms." They are developing their version of a CUBESAT, a small 2.2-pound satellite measuring only four inches on a side.

Augustus Moore provided an overview of the program to develop a common bus structure nanosatellite that could be easily adapted for various communication and science projects. Todd Kerner KB2BCT, a ham since age 14, provided technical details on the internal systems. Amish Parashar KE6EZM described the antennas for the basic two-meter and 70cm satellite.

While Bob Bruninga WB4APR usually provides a focus on digital communication topics and APRS, his first AMSAT 2000 Symposium presentation was for a microsat-style satellite carrying a linear transponder with a 10-meter uplink and a two-meter downlink, the inverse of what we commonly call Mode "A" (2 meters up and 10 meters down). His premise was that 10-meter transceivers and two-meter receive converters are inexpensive compared to ground equipment

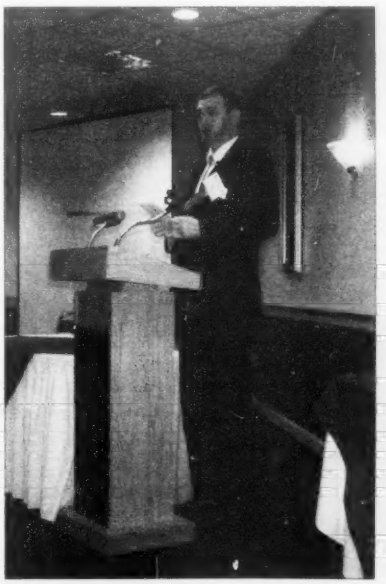

***Photo A.** Chairman of the AMSAT 2000 Space Symposium and Annual Meeting, George Caswell Sr. W1ME.*

Photo B. *Chuck Duey KIØAG makes contacts via UoSAT-OSCAR-14 while Bruce Paige KK5DO logs at the AMSAT gathering in Portland ME.*

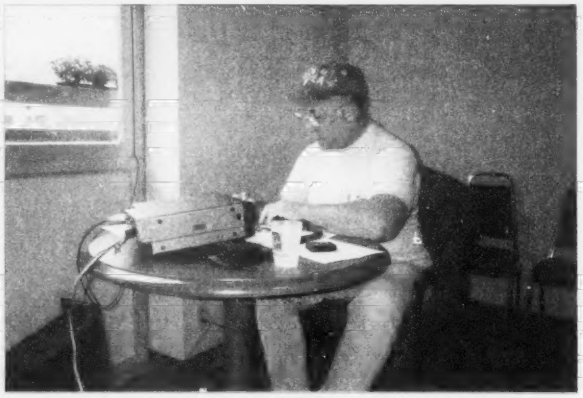

Photo C. *Ernie MacLauchlan K1ELA checks out the HF bands from the AMSAT Space Symposium Special Event Station (QSL via KK5DO) using the AMSAT callsign W3ZM.*

needed for Mode "A". Bob also proposed an in-band 10-meter repeater in orbit. This would be even easier to use. While a 10-meter uplink is not currently authorized, it would be worth consideration to change the rules governing this allocation.

Following lunch, the programs continued with more CUBESAT information from Prof. Bob Twiggs KE6QMD of Stanford and Cliff Buttschardt K7RR. Bob is working with over 20 groups to develop various types of the four-inch-on-a-side CUBESATS that can be easily deployed by a larger launcher satellite.

Chuck Duey KIØAG provided a lively talk on tricks, hints, and tips for portable satellite operation. Chuck makes it look easy. He has operated from remote loca,'ons all over North America, handing out new grid squares as he goes.

The nature of the presentations became more technical and esoteric when Dr. Tom Clark W3IWI brought the audience up to date with advances in the Global Positioning System (GPS) world. Tom has been experimenting with extremely accurate GPS receivers that are capable of time measurements less than a nanosecond. Some Internet sites to check for details include [http://tac.ggao.nasa.gov] and [http://gpstime.com].

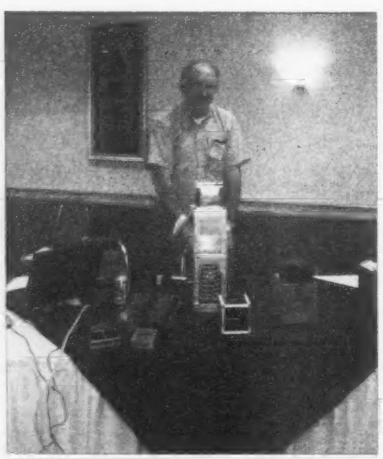

Photo D. *Prof. Bob Twiggs KE6QMD of Stanford showed some of the prototype gear for launching CUBESATS.*

After a short break, Matt Ettus N2MJI explained his concept of a spread-spectrum wideband transponder for the International Space Station. The focus of his system is to create a system that would provide varying levels of service, depending on the complexity of the ground station, for paging, digital voice communications, video, and high-speed data transmission.

Tony Monteiro AA2TX came with an update to his already-successful InstantTune software for automatic frequency control of the Yaesu FT-100 Field Commander for satellite operation. The software can be downloaded from AMSAT's Web site, [http://www.amsat.org]. Go to the section under InstantTrack Utilities.

Even more exotic than these high-tech talks was Dr. Paul Shuch's (N6TX) explanation of the efforts of the SETI League (Search for Extraterrestrial Intelligence) to use the processing power of thousands of computers around the world to processed digital data from radio telescopes to find evidence of life elsewhere in the universe. It's called "SETI at Home."

The technical presentations didn't end with dinner. Evening talks were provided by Gould Smith WA4SXM with an introduction to amateur-radio satellites, and a parallel set of sessions featuring more from Paul Shuch N6TX, Bob Twiggs KE6QMD, Prof. Gil Moore on Project Starshine, and Peter Heard on Aerospace Science in schools and the home.

Saturday

Randy Kohlwey N7SFI was the first presenter on Saturday morning. He brought details on the payloads that are being built to fly on the new OS-II satellite being developed by One-Stop Satellite Solutions (OSSS). After providing information about the high-speed data-communication capabilities of the satellite, Randy gave details on ground-based hardware and software that users would need to receive the S-band (2400 MHz) downlink running at 153,600 bps. His paper in the proceedings gave a number of excellent sources for further study.

Dick Jansson WD4FAB followed with "So You Want to Build a Satellite." Dick has been a key player on mechanical and thermal hamsat design work for many years. Phase 3-D work has been a 10.5-year project. Phase 3-D will not be duplicated anytime soon, but the lessons learned will provide direction for future satellites. Dick proposed a simpler approach for future AMSAT satellites that will provide DX opportunities, no internal propulsion systems, cost no more than $500,000, and weigh less than 50 kg. Phase 3-D weighs in over 600 kg, and has been quite expensive in both human and financial resources.

Dick went on to describe, with overhead slides and commentary, his vision of Phase 3-E. The satellite could be either similar in shape to Phase 3-D or more rectangular (depending on launcher requirements), but much smaller (about 36" wide and 18" high), and without the extendable solar panels.

The physical design would target a launch on an ASAP-5 platform (a ring around the lower part of the primary satellite for small experimental satellites) on an Ariane 5 rocket. High-efficiency transmitters and an

elliptical orbit to provide wide coverage from apogee (the high point of the orbit) would be needed, along with a short project life on the order of three years.

Bob Bruninga WB4APR came back for a second presentation to the AMSAT 2000 Space Symposium. He has been actively pursuing methods of providing APRS operations via satellite. Bob would like to see a hamsat that would provide easy mobile or hand-held access from anywhere on earth. While the current terrestrial APRS network is accessible from most population centers, the goal is to extend connectivity to allow short messages to be sent globally.

Bruce Paige KK5DO updated the symposium attendees on activities associated with the Houston AMSAT Net. Unlike other local or even HF information nets, coverage for the Houston net is global. Using a geosynchronous commercial satellite link for North American coverage and a live Real Audio feed for everywhere else, the net has become a prime source of information for those that like to listen to the interactive discussions that ensue between W5ACM, KK5DO, WD5DZC, and K5OE. You can get all of the details online at [http://www.amsatnet.com]. The Web site also has Real Audio recordings of all of the Space Symposium presentations.

We are looking forward to significant amateur-radio activity from the International Space Station. Frank Bauer KA3HDO and Will Marchant provided a complete description of the systems that have been sent to ISS and those that are planned for the future. While the initial gear is similar to items carried on the shuttle under the SAREX program (Shuttle Amateur Radio EXperiment) for VHF/UHF analog and digital communications, future plans include HF and microwave gear and specialized modes like Slow Scan TV (SSTV) and Fast Scan TV (FSTV). As negotiations continue with NASA, the system configurations are in a state of flux. You can keep up with everything via the Internet at [http://ariss.gsfc.nasa.gov].

Steve Bible N7HPR was not available to discuss his paper on a PIC-based Rotor/Radio Controller Interface, but Keith Sproul WU2Z had related information on software that works in conjunction with the hardware.

Keith presented his paper "APRS and the TAPR Easy Trak." This az/el rotator control system provides an interface for computer-controlled satellite tracking when used with popular tracking software, or provides a number of manual and automated features such as automatic balloon tracking (or other airborne devices), when latitude and longitude data is available from GPS data from the payload. Check out the TAPR Web site [http://www.tapr.org] for hardware information on "Easy Trak."

AMSAT Executive Vice President Robin Haighton VE3FRH opened the Saturday afternoon presentations by reading new E-mail updates directly from Kourou with information on Phase 3-D and the launch status. Various members of the team that have been to Kourou for early parts of the launch campaign followed with more pictures and descriptions of the facilities and satellite checkout procedures at the European Space Agency's South American launch complex.

Ken Ernandes N2WWD has been developing pre-launch element sets for hamsats and shuttle flights. His paper "Estimating Keplerian Elements for New Satellite Launches" provided insight into the methods he uses to provide these predictions.

Ms. Itziar Martinez covered a very technical paper promoting a new design of the G3RUH software modem for high-speed digital communications. Innovations in the synchronization algorithm and filter design have promise of providing improved modem performance.

All of the papers presented at the Space Symposium are available in the *Proceedings of the AMSAT-NA 18th Space Symposium and AMSAT-NA Annual Meeting*. This 192-page document can be obtained from AMSAT. Check the Web site [http://www.amsat.org] for contact information.

After a short break, the yearly AMSAT General Meeting followed. This was an opportunity for AMSAT members to ask questions of the officers and Board of Directors members. Other Saturday evening events included the Annual Banquet, Awards Presentations, and prize drawings. The Grand Prize this year was a Kenwood TMD-700A digital/analog mobile transceiver. During the banquet, the speaker was R. Cargill Hall, Chief Historian of the National Reconnaissance Office. Did you know that OSCAR-1 went to space as ballast on a spy-satellite launch?

Sunday and More

Once every year AMSAT's Area Coordinators have an opportunity to meet with each other in person. At the AMSAT gathering it has been traditional to have an Area Coordinators' Breakfast early on Sunday morning after the completion of the Symposium, General Meeting, and Banquet. They share experiences and information regarding their individual efforts to give talks to clubs, run booths at hamfests, promote net activity, and advertise the existence of AMSAT and the hamsats.

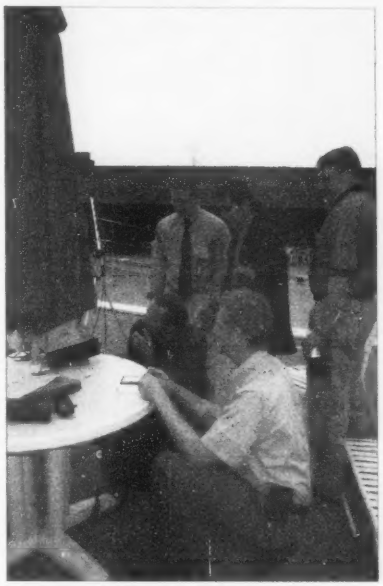

***Photo E.** A poolside Fuji-Oscar-29 pass with Chuck KIØAG and Bruce KK5DO, while Todd KB2BCT, Amish Parashar KE6EZM, and Gould Smith WA4SXM look on.*

Following the AC meeting, Russ Tillman K5NRK chaired the AMSAT Strategy Workshop. While the group knows that the focus of the organization has been, and will

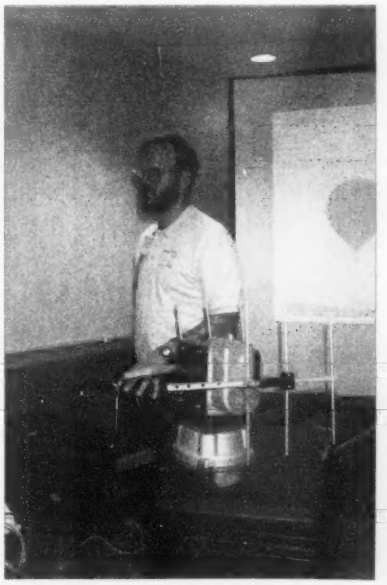

***Photo F.** Keith Sproul WU2Z demonstrated a new az/el rotator control system from the Tucson Amateur Packet Radio Society (TAPR).*

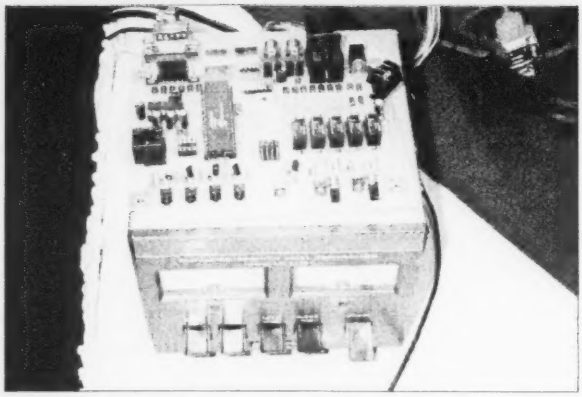

***Photo G.** Close-up of the Easy Trak computer-to-rotator interface hardware from TAPR.*

continue to be, on Phase 3-D, the question, "Where do we go from here?" needs attention.

Although many of the Phase 3-D volunteer designers and builders are tired, many others are already moving on to new ideas and projects. Just a few of the proposed strategies of AMSAT, the organization, include enhancement of user-oriented operations, mentoring to educational and other organizations, exploitation of Phase 3-D as a resource, and the promotion of worldwide amateur-radio satellite coverage. During the Strategy Workshop, many other possible future goals and projects came to the floor. One key point was clear: If you don't know where you are going, it doesn't matter how you get there.

In the past, AMSAT's projects have been driven by launch opportunities. This will not change, but the focus of the payloads, digital or analog, low VHF or exotic microwaves, experimental telemetry or communications, will be based on what the core enthusiasts, both users and builders, want.

The AMSAT Board of Directors meeting convened on Sunday afternoon. The first order of business was to elect officers. Keith Baker KB1SF did not wish to serve another term as president due to personal obligations. Keith has done a superb job of leading the organization in recent years. Robin Haighton VE3FRH was unanimously elected as the new president of AMSAT. Ray Soifer W2RS, one of the founders of AMSAT, was elected as the executive vice president.

The typical meeting takes nearly two days, and this year was no exception. Agenda topics are discussed until a consensus is reached. This takes time due to the diverse personalities of the board members. Issues addressed included the significant financial drain of Phase 3-D and the impact on the year 2001 budget, future projects, field operations, publications, support for International Space Station ham-radio operations, and numerous administrative matters.

AMSAT currently stands at a crossroads. Phase 3-D has been the largest project to date. It's time to review the lessons learned from the experience and move forward to the new challenges and opportunities of this first decade of the 21st century. 73

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***Photo H.** At the AMSAT Annual Banquet, the guest speaker was R. Cargill Hall, Chief Historian of the National Reconnaissance Office.*

Joe Moell P.E. KØOV
P. O. Box 2508
Fullerton CA 92837
[Homingin@aol.com]
[http://www.homingin.com]

A New Millennium for Foxhunting

Am I the only writer who hasn't used the "M" word in the last two years? There hasn't been good reason to until now, as it was not until this issue that 73 Magazine *and ham radio officially entered the third millennium A.D. It's an exciting time for our hobby, especially for hams who like on-foot hidden transmitter hunting under international rules, which goes by the names foxhunting, fox-tailing, radio-orienteering, and ARDF.*

For the second time, stateside hams have traveled to compete in the World Championships of ARDF. The last ARDF Championships of the second millennium were October 13-18, 2000, in Nanjing, China. As I write this, most of the twelve Team USA members (in **Table 1**) have just returned from the trip. Two are still in China on an extended tour. All are eager to tell their experiences to other hams, in hope that Team USA for the next Championships will be bigger and better.

Although there was no real-time reporting of the events, the Internet provided the next best thing. But I'm getting ahead of the story. First, as background, I should mention that ARDF World Championships host usually provides low-cost housing such as barracks and hostels. All competitors pay a fee (typically US$200) that includes lodging and food for five overnights as well as local transportation, a tour, and admission to the events. The only extra charges are for the closing banquet (about $15) and transportation to/from the airport.

For the 1998 World Championships in Hungary, competitors were housed in dormitories of a teacher's institute. What would the facilities be this time? Surprise! Everyone stayed in the Jiangsu New Century, a four-star luxury hotel on Xuanwu Lake with 324 rooms and suites. According to its brochure, all rooms are equipped with "DDN high speed optical data line." The facility also features a swimming pool, tennis court, gym, game room, bowling alley, and dancing hall.

Five nights of this plus participation fees for just $200? How did they do it? More important, how can the USA ever put on such an event at a similar price?

Americans in demand

The hotel was indeed beautiful (see **Photo A**), but the Internet features weren't universal. According to Bob Frey WA6EZV, "The

Continued on page 50

Name	City/State	Division
Dick Arnett WB4SUV	Erlanger KY	Old-timer
Bob Cooley KF6VSE	Pleasanton CA	Veteran
Robert Frey WA6EZV	Cincinnati OH	Old-timer
Dale Hunt WB6BYU	Yamhill OR	Jury
Marvin Johnston KE6HTS	Santa Barbara CA	Old-timer
Harley Leach KI7XF	Bozeman MT	Veteran
Karla Leach KC7BLA	Bozeman MT	Veteran
Jack Loflin KC7CGK	McMinnville OR	Senior
Gyuri Nagy HA3PA	Melrose MA	Senior
Jay Thompson W6JAY	Santa Ana CA	Junior
Richard Thompson WA6NOL	Santa Ana CA	Trainer
Csaba Tiszttarto	Staten Island NY	Senior

Table 1. *Team USA members.*

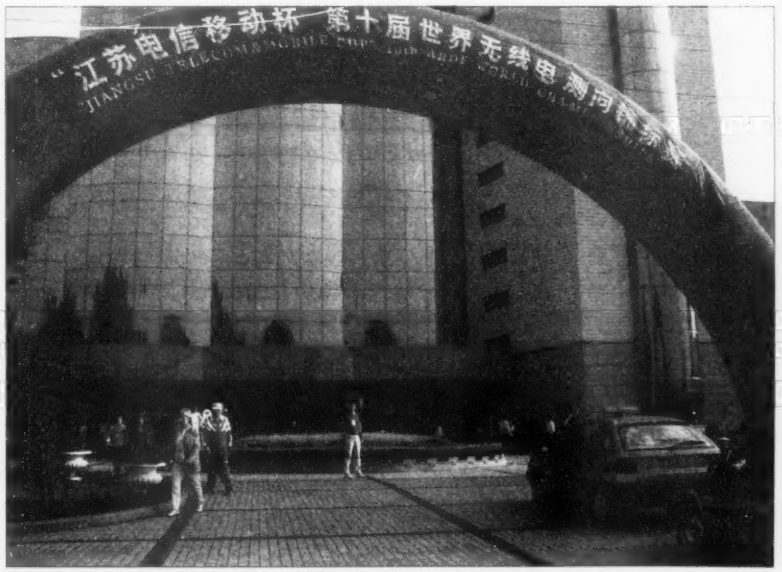
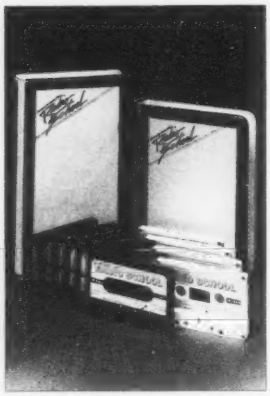


Photo A. *ARDF World Championship participants were housed in the 4-star New Century Hotel. A giant red banner in front proclaimed the events. (Photo by Dick Arnett WB4SUV)*

New Products



Free On-Air Code Learning Instructor Cassettes

Morse Code instructors may hold their code-learning classes over their local repeater or simplex frequencies with free code-learning cassettes from Gordon West WB6NOA. Each cassette is 90 minutes long and recorded monaurally for easy player-to-microphone pickup.

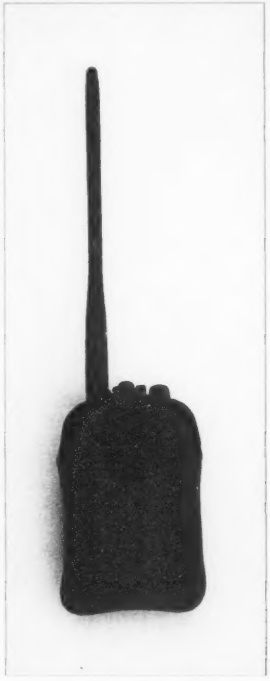
"All of the code-learning practice is narrated, and these audio cassettes are ideal for instructors to play over their local repeater system," comments West, well-known for his innovative amateur radio teaching methods and materials.

"Instructors may also use these cassettes in the classroom, too, working in live code off the air as well as for additional code practice using computer programs or a set of paddles," adds West.

CW instructors may receive these cassettes at no charge by including a brief letter describing their upcoming on-air or in-class scheduled code course, as well as 10 first-class stamps for Priority Mail delivery.

"These free training cassettes are part of the Ham Ambassador program, and I encourage all instructors and repeater control operators to take advantage of this unique teaching opportunity," concluded West.

Send your request and class details to: Gordon West Radio School, 2414 College Drive, Costa Mesa CA 92626.



The Hold-It NEO™

Finally, a neoprene pouch that looks professional. Those PowerPort designers have taken the leap from leather to high-cushion neoprene. We got ours in Can't-Lose-It Red, but for the more subtle among us, they also carry it in Covert Black.

The Hold-It NEO has a great look, with all edges fully finished. When you wear your radio all day, every day, it gets quite a bit of abuse. The NEO gives ample coverage and shock absorbency to protect it from the day-in, day-out hazards you always seem to run into.

In talking with the folks from Cutting Edge, we were happy to find out that they have NEO models to fit many radios, and even one in the works to hold those new FT-817 QRP radios from Yaesu. We'll keep you posted. MSRP: $14.49 and up.

For further information, contact Cutting Edge Enterprises, 1803 Mission Street, Suite PMB-546, Santa Cruz CA 95060; tel. (800) 206-0115; E-mail [info@powerportstore.com].

Mini-News from MFJ

• MFJ's model MFJ-434 contest voice keyer sends your call and does contest exchanges for you in your own natural voice. You can record and store up to five messages for a total of 75 seconds, as well as repeat them if desired and even vary the repeat delay from 3 to 500 seconds. Transparent to your mic, so your mic's characteristics don't change when it's installed. SMT technology. MSRP: $179.95. Uses 9V battery, 9–15 VDC, or 110 VAC with optional MFJ-1312B cord ($14.95). MFJ-73 remote/computer control head with cable, $29.95.

• The MFJ-297 professional-grade desk mic is designed for ham radio communications where speech intelligibility makes a difference. Frequency-tailored to bust through QRM and noise; choice of DX punch or broadcast quality audio; Sibilant Sound Shield lets you talk close to minimize background noise but still not have distracting hiss. Many more features, including 11-inch boom. MSRP: $69.95.

• MFJ's professional-quality MFJ-394 single (left) ear boom mic lets you keep your hands free for contesting, DXing, traffic nets, and mobile operation. Leatherette padding and headband, 1/4-inch headphone jack, 3.5mm mic jack. MSRP: $74.95. For cables, please inquire.

For further information, please contact MFJ Enterprises, Inc., P.O. Box 494, Mississippi State MS 39762; tel. (800) 647-1800; fax (662) 323-6551; E-mail [mfj@mfjenterprises.com]; Web [www.mfjenterprises.com].

15m CW Transceiver Kit

Oak Hills Research has announced a new addition to its line of QRP transceiver and accessory kits — a 15m version of the OHR 100A QRP CW transceiver.

Available for 15-20-30-40m, the OHR 100A has an enviable reputation for ease of building, performance features, and operator convenience at the reasonable MSRP of $129.95 (can also be built to order). Alignable for General or Novice, it puts out 4–4.5 watts of RF.

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For further information, contact Milestone Technologies, Inc., 2460 South Moline Way, Aurora CO 80014-1833; tel. (800) 238-8205; E-mail [hq@MorseX.com]; Web: [www.MorseX.com].

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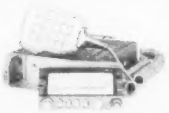
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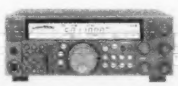
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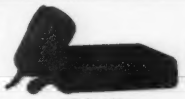
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Photo B. *Team USA 2000 poses behind the flag at the opening ceremonies in Nanjing. Left to right in back row: Jack Loflin KC7CGK, Gyuri Nagy KF6YKN, Jay Thompson W6JAY, Richard Thompson WA6NOL, Csaba Tiszttarto, and Bob Cooley KF6VSE. Front row: Karla Leach KC7BLA, Harley Leach KI7XF, Marvin Johnston KE6HTS, Bob Frey WA6EZV, and Dick Arnett WB4SUV. Dale Hunt WB6BYU (IARU Region 2 Jury Representative) had not arrived. (Photo by Dick Arnett WB4SUV)*

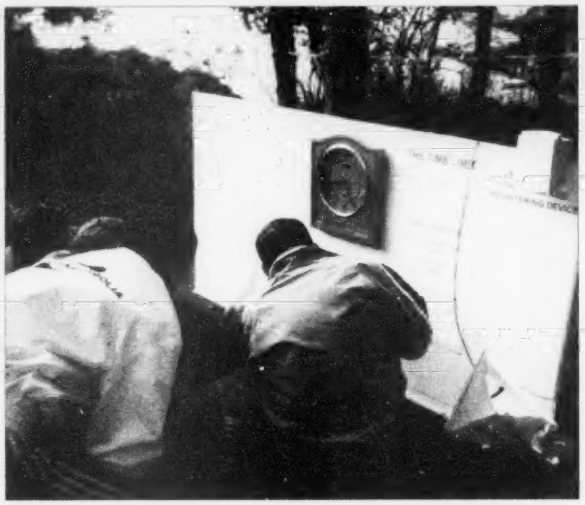

Photo C. *Each competitor is told his exact start time well in advance. These competitors are checking the time and getting other information such as time limit and frequencies. (Photo by Marvin Johnston KE6HTS)*

Homing In

continued from page 47

room I shared with Dick Arnett WB4SUV was one of only a few with Web access. As a result, it seemed that we had the most popular place in the hotel. Three or four others had computers, but most didn't work. It was hilarious, the flow we had in and out, including Australians, Belgians, most of Team USA, and others."

Just as in the Olympics, the opening ceremony of an ARDF World Championships is a major event, with parades, performances, and speeches. All of the teams march in and stand behind their national placards and flags (**Photo B**). "Twenty minutes afterward, the other teams had pretty much broken up and were mingling among the crowds," says WB4SUV. "But our team was still standing together after an hour and a half because people, mostly Chinese, were wanting to take pictures of us.

"As soon as one would finish, another one would come up. They would put their children in front of us, or we would hold a child and stand with the USA flag for them. They were so astonished that we were there. If they spoke English, most of them would ask, 'Are you the champion in your country?' We would have to explain that primarily we were there to learn the sport."

Regular "Homing In" readers remember the difficulty of the World Championship ARDF courses in Hungary two years before. (See the January 1999 issue.) Those who attended both events agree that the Y2K sites were even more arduous. As usual under International Amateur Radio Union (IARU) rules, the Seniors (males ages 18 to 40) had to find five foxes, each transmitting for 60 seconds in sequence. Those in other age/gender divisions had to find four of the five. They had to get to the finish line within 130 minutes or be disqualified (**Photo C**).

"The tough course started right out of the gate on two meters," WA6EZV recalls. "You had to climb 200 meters immediately. Once on top of the ridge line, you looked out over a huge valley, and up the other side of the valley you saw these little ant-sized people going up a steep hill. It about wiped you out. There was no trail, just straight up the side of the hill.

"The other problem was that a couple of trails ran out," Bob continues. "They may have been there years ago when the map was made, but they're overgrown now. On the way back with just a few minutes before time-out, I hit an area that on the map appeared to be 500 to 600 meters from the finish. Suddenly the trail stopped with no sign of anything to follow. I took a bearing and headed into the woods. Big mistake! I was soon in a jungle so thick that I could hardly maneuver. At that point, I slipped and lost my map board. I recollected myself and realized my glasses were gone, too."

WA6EZV kept going without his glasses and got to the finish a half hour later. Despite his weariness, he managed to sprint over the line. "Then the craziest thing happened," he says. "While I silently lamented my finish, someone walked up to me and asked if I had enjoyed myself. I answered 'Yes.'"

WB4SUV had a similar problem with disappearing trails. "The vegetation in the trail that went blank on me got so thick that literally I could not see two feet in front," Dick says. "I knew I had to go west to get to the finish and there weren't any other trails on the map going that way, so I just plowed my way through. Suddenly, I found myself at the bottom of a 12-foot cliff looking up. I caught my breath and gathered my senses, then realized that my map was somewhere in the vegetation, not to be found anymore.

"I began plunging my way further and realized that in the fall my receiver had died also. That meant I couldn't use the radio beacon at the finish for navigation. The only thing left was my compass. So I just kept heading west. When I finally popped out onto the big north-south trail that led to the finish, I thought I was to the north, so I went to the left.

"After I went about a mile, I saw in the distance a huge area covered with red-white-and-blue tarps, and some people. The tarps were just like the ones that had been used to impound our radio direction finding (RDF) equipment before we started. I went in that direction through a creek and across rice paddy to get there and then realized it was only a farm that had tarps on the equipment. So I had to I backtrack. If I had gone right on the main trail, I would have been only about 100 yards from the finish."

A Second Chance

After a day of rest and touring, it was time for the 80-meter competition. Weather was very rainy, so organizers increased the time

limit to 140 minutes. All Team USA members decided on a much more conservative game plan this time. As a result, no one went overtime and all but two posted a much better time than on two meters.

"Every time you went under a bamboo tree and brushed it, you got soaked," says WA6EZV. "It was as if somebody turned a bucket over on you. We got so wet that we didn't care any more. Fortunately, it wasn't cold. Actually, the temperature was great for running."

According to Dale Hunt WB6BYU, the trails turned into thick mud (**Photo D**). "Most competitors' shoes got covered with it," he says. "By the time we got back to the hotel, they were using a special entrance for us with the red carpet rolled out, just to collect the mud. Then we had to take off our boots and put on slippers to protect the floor. But the earlier arrivers had already messed up the front entrance. The following morning, they had bedsheets out on the upper floor of our hotel because we had tracked in so much mud.

"The end of the 80-meter finish corridor was wet grass," Dale continues. "You had to stick your card into the machine to determine your official ending time. A lot of people went sliding right by. There was nothing to hold onto because the machines were on a wavy post. A lot of people went 6 or 8 feet past, slipped and fell on their equipment and scrambled back up to go punch their card. I saw one guy break off the sense antenna of his RDF set that way."

One member of our team got almost as wet and muddy as the others, but he wasn't running on the course. WB6BYU had been selected to be the first person from IARU Region 2 (North and South America) to serve on the international jury. This 12-member panel made sure that contestants were properly started and timed. It also verified the results from the electronic scoring system, acted on any protests from competitors, and certified the results of each hunt.

Dale expected to spend the competition hours keeping watch over one of the fox transmitters in the forest, but the Jury Chairman had another job for him. "I called starting numbers," he says. "Every 5 minutes I told the next competitors to get their maps and gear. They assigned me to that role because I had the best English skills. In European ARDF championships, the jurors are expected to have fluent English, because it's the official language. But that was not the case here. They had me calling names and numbers because I could pronounce them, and if somebody had a question I could answer or know what to do about it."

Photo E. *Tom Curlee WB6UZZ (left) explains foxhunting to a group of Scouts at JOTA 2000, assisted by Scoutmaster Kent Gardner WA7AHY.*

Of course all participants got a good taste of China, in every sense of the word. WA6EZV remembers, "On the local tour before the 80-meter event, they took us out and served us a classic Chinese dinner at what would be considered a very ritzy restaurant. They brought out lots of little dishes, one or two at a time, including the Pig's Ear, the Coagulated Duck's Blood Soup, the Pickled Duck Eggs, you get the idea."

WB6BYU tells how several team members met the locals. "One of the busses had a flat on the way back from the 80-meter event. They were in a tiny village with about three buildings where the citizens aren't used to seeing foreigners. The bus had a spare tire but no jack, so they had to wait an hour for the next bus. They ended up in a little house where they had a wonderful time visiting the occupants, with the help of interpreters, who were English students from the university. Harley Leach KI7XF handed out chocolate bars to the kids, so he got the mud washed off his boots."

Continued on page 59

Photo D. *Runners start and finish through long corridors so that those waiting cannot get clues by seeing which way they go. This 80-meter corridor turned into a very muddy trail in the rain. (Photo by Marvin Johnston KE6HTS)*

Photo F. *Two days after returning from the ARDF World Championships, Jay Thompson W6JAY showed Scouts how to take bearings.*

Steve Nowak KE8YN/4
1011 Peacock Ave. NE
Palm Bay FL 32907-1371
[ke8yn@netzero.net]

Do YOU Want to Help Out?

When dealing with emergency communications, many hams view the event as a "Come As You Are" party. While it is true that many people are needed in the event of an emergency or disaster, and all volunteers are welcome, there are a number of established organizations that provide the structure around which a response can be built.

How many different types of organizations that hams support can you name? You may be surprised at how many opportunities there are for you to make a difference.

Public Service Agencies: Many police and fire departments utilize volunteers in the event of an emergency either to provide additional communication through the ham bands or to provide additional trained operators on their own systems. Many times these operate independently of other disaster services. In other cases, in the event of a major emergency or disaster, all communications support may be centrally coordinated through a state or county agency to ensure that the various requests are adequately prioritized and addressed accordingly.

Social Services: The Red Cross and Salvation Army are virtually synonymous with the word disaster. Organizations such as these provide support for everything from housing for those displaced from their homes to a hot cup of coffee for those working at the scene of the disaster. While these may be the best known throughout the country, there are other worthy groups who may be active in a particular area. Recently there has been an increased focus among local churches to set up facilities to assist in an emergency. In fact, some pastors have begun to offer ham radio classes at their churches as a way of ministering to those in need!

RACES: The Radio Amateur Civil Emergency Services (RACES) was founded in 1952, initially in response to the emergence of the Cold War following World War II. By definition, RACES provides communications to local or state civil-preparedness agencies. Originally this was perceived to be a wartime requirement in support of Civil Defense, but later was extended to other types of emergencies. Ham radio operators must be registered with the local civil-preparedness agency having jurisdiction to operate as a RACES station. In essence, RACES exists to support declared emergencies and in the event that the President would invoke the War Emergency Powers Act, non-RACES amateur stations could be prohibited from transmitting and RACES stations could be limited to certain frequencies. The FCC used to issue licenses specifically for RACES, but that no longer is true.

ARES: The Amateur Radio Emergency Service is similar to RACES in many respects. Some people see the two as competitive and try to pick sides, but the two actually work in concert with one another. RACES has some specific limitations. It can only operate in a declared emergency except for drills that are limited to one hour per week. ARES does not have any such limitations; in fact, holding dual membership permits a smooth transition during an emergency before it is declared by the civil-preparedness agency and after. Before the declaration, everyone can operate under ARES coordination and upon declaration, as RACES stations.

REACT: Radio Emergency Associated Communications Teams were once associated only with Citizens Band operators. As time has passed, though, this has expanded to include GMRS (General Mobile Radio System), cellular telephone, and amateur communications. Many times REACT acts not only as another emergency service, but also a pool for potential hams.

SKYWARN: While SKYWARN is usually involved in a developing disaster rather than in disaster support, it is such an important function that I have to include it. SKYWARN operators are trained by the weather service to report weather conditions. This information is critical to the weather service because it allows the meteorologists to correlate physical weather conditions with their telemetry and radar images. This is usually coordinated through the ham bands, and many weather professionals have become licensed hams because of this important service.

MARS: The Military Affiliate Radio System uses ham radio operators who have been trained in military communications to provide backup, health and welfare and emergency communications in support of the armed services. MARS has defined roles in emergency support that can complement the other amateur radio services. MARS stations operate on frequencies outside the amateur bands as authorized by the cognizant military authority. Their procedures are carefully defined to minimize transmission time and all MARS operators have completed appropriate training programs. Unlike transmissions on the amateur bands which can be monitored and quoted by anyone (including the news media), MARS transmissions are not to be used by those who might hear a transmission. This provides an additional resource for sensitive information such as a list of names of casualties that has at least some degree of protection to ensure confidentiality.

NTS: The National Traffic System provides an organized method of transferring a written message from one location to another by use of various modes and means, including a series of relays from one station to another to ensure the message's delivery to its ultimate recipient. In an emergency or disaster situation, the NTS provides a means for handling health and welfare traffic into and out of a disaster area. Often the first news about a friend or family member's safety has NTS as a key player.

Continued on page 61

THE DIGITAL PORT

Jack Heller KB7NO
P.O. Box 1792
Carson City NV 89702-1792
[jheller@sierra.net]

Makes Me Wanna Stream!

You would think I could make a decision as to what to write about and stick with it, but something a little out of the ordinary happened a few days ago. I was contemplating an SSTV article because I have ignored that area for a year or so. There is a lot going on there and so I was monitoring signals and checking on software availability.

Then I received a minor distress call from a friend about WinWarbler and, as I was tuning across the band from the SSTV area to the PSK31 portal, I heard a strange warble. I had heard this before around the 14.180 neighborhood and had not been able to make sense of it.

This time, I nearly passed it by, but I said something like, "What the heck, one more try will take just a minute." I brought up the copy of Stream from IZ8BLY and fiddled with the tuning until something looked like it was about nailed in the sidewinder waterfall. I had been focusing so intently on the waterfall that when I glanced to the receive panel I was pleasantly surprised to see intelligible print for the very first time since I had downloaded this program.

Now I knew of at least one hangout for the MFSK16 gang. I had heard rumors of different places, but here they were. And, believe me, I did nothing to disturb the comfort of their habitat. I didn't tell them a word about how they were supposed to be anywhere else.

I simply joined the fray and managed to enjoy two memorable QSOs, the first with Tom ND5Y and the second with Bruce VE6ATY. The following day, I had a few more contacts in the same area with this mode and found that most of the hams I was contacting were also just getting started. Strange how we seemingly pounce all at once when the right time comes along. By the time this hits print, this will all be ancient history in ham digital annals.

The screenshot this month is the IZ8BLY Stream software in action as I was working Paul up in Seattle. As you can see, there is considerable area to display the received as well as the transmitted messages for several minutes. This can relieve the strain of having to scroll and look for information that has suddenly disappeared.

But the ingenious part of the display is the waterfall on the right side. In some respects, it takes some getting used to because you have to learn which way to tune to pick up the signal you can hear which is outside the relatively narrow waterfall boundaries. Once you are over this small hurdle, the precise tuning that is necessary for this mode is a piece of cake.

When you bring the mouse cursor into the waterfall area, an arrow appears. Whenever you click your mouse key, the horizontal line represented by that arrow moves instantly to the bottom tuning parallel in the waterfall. In other words, as soon as you spot the bottom edge of the incoming signal crossing the waterfall, move the arrow to that point and click. You are tuned. In a few seconds, print will show up on your screen. Fun!

This is another of the many free programs developed by a devoted amateur for the benefit of the ham community. It can be downloaded from the URL listed in The Chart on the same line as Hellschreiber and MT63, other programs from IZ8BLY. It installs like any good Windows program is expected to install, with a set of on-screen instructions for you to follow.

You will have to make your own start menu or simply go to the directory where you installed the file and double click on the Stream startup file. You will also find in that file the Help folder. I strongly suggest you open that file and print the contents. The Help file does not automatically load on installation.

The program is so intuitive you will find little reason for the Help file once you get up and running, so not having a Help to click on is not much of a disadvantage. However, it is to your advantage to read the Stream Help file all the way through to realize all the features available and how to use them. Also, you will find paths to seek help from other users such as through the MFSK reflector.

You will be a little surprised to realize the Stream software also supports three other modes. The very familiar PSK31 is available, plus a new PSK63F and MFSK8. If that isn't enough, the program contains a command to go into "standby" mode while you bring up any other program to experiment with and compare with the station you are in contact with. Versatility gets redefined.

While I am thinking of some of the new stuff we get to play with in preparation for this column, let me mention a forum speaker I witnessed at the recent ARRL Pacificon convention. He was expounding on some things that sounded a bit outlandish having to do with how we were going to eventually be using a totally different concept in radios.

His first mention was Software-Defined Radios, and then he spoke of Smart Radios that would sense the other users of the spectrum and find ways to interleave amongst those signals to transmit and not cause interference. I sat through this for about ten or fifteen minutes and was about to give up on the lad when, suddenly out of the blue, he said something that connected for me, if not for others.

He mentioned the software control of radios such as we see in Kachina, and also Ten-Tec with their Pegasus. And he referred somewhat to those as being examples of the future radios, I suspect in some embryonic form. Incidentally, if you go [www.Dandin.com] and click on "Reports" you will get a bare overview of the subject. The subject centered on spread spectrum, which hasn't caught my interest as yet. I suppose it is difficult to imagine how you comment

on a 599 signal in that mode — of course we give those reports in PSK31 and think it's cool.

But nevertheless, it got me to thinking. My next step was to take a good look at the Kachina display in the next building and watch the very fancy moves the demonstrator was putting on the lookers-on. I won't say this as yet fit the description of the Smart-Radio-of-the-future, but it is certainly many steps closer than anything such as I use with the knobs on the front of it.

I talk to hams several times a week who are using either of the above-named rigs and they are all very happy with their capabilities. One of the things that is obvious is how easily updates are incorporated. The manufacturer either sells a card to insert or supplies an often-free software update. There is no sending back to the factory for major mods or the need to replace the rig.

I think at this time that my new Icom with the knobs on the front has more flexible filter control and as steep sides on those filters as anybody can build, but there are no simple board or software updates for this kind of rig. If someone really builds something a whole lot better, Icom I am thinking in this case, the upgrade will cost another rig. Something to think about. And all the while we are plugging in little cards in our computers and loading software just like it is the future already when we work with this digital stuff.

And that leads me back to another part of this action-filled day. One of my Pegasus friends, Les WA7HAM, had been using DigiPan on his digital rig and was quite satisfied and then, following a suggestion he claims came from this column, installed WinWarbler. Here he was at a new ball game in a strange new ball park.

I know he liked it immediately. Then he dropped me a line complaining about the display in the waterfall lacking contrast. He felt like his glasses were fogging over and did I have any suggestions?

So, I gave it a bit of thought. Actually that was when the interruption came along and I discovered the MFSK16 above. But I recalled the WinWarbler has some Preference adjustments for the tuning spectrum. If you click the "Config" key and then select the PSK tab in the screen that comes up, you will find many choices to enhance your tuning pleasures. One of them brings the waterfall around to a configuration reminiscent of the DigiPan waterfall. Another brings up a well-defined spectral display.

When I did hear back from Les, he told me he had already discovered all these tweaks and still felt the other program was easier to tune. I can only go on the fact he liked everything else about the program. I don't know of any other software where the tuning panel has so many options.

You may be among those who find, from time to time, that the URLs in The Chart are incorrect. I appreciate any word on those changes. It takes a few months from the time I learn of them until I can get them changed in the magazine. But I do try to keep on top of it and supply what info I can as soon as I can.

I mention this because I have had several inquiries of late about inaccuracies in need of update (other than omissions in transit which I also provide answers for) about the Logger and K4CY scope programs. I found the listing had to be changed again on the Logger and Zakanaka, so that is new again as of this month.

Also, a wakeup call came in from an old friend, Bob W6EUZ, that he couldn't raise the Pasokon SSTV site we have displayed in the chart for so long. I checked every which way I could for some address change and kept coming at a dead end with the "can't be found"–type messages. The result was a contact to John Langner, the author of the very informative Web site and a short time later, all was well again. The info with the software is back for our viewing and using pleasure.

I have used the Pasokon Lite in my laptop, and it has worked very well for portable applications. A truly remarkable feat I have mentioned often. The software works in DOS mode and seems easier for the laptop to control than some of the Windows™ applications.

If you are looking for the audio spectrum scope, it appears the K4CY scope has disappeared; I have referred folks to the IZ8BLY download page because I know Nino wrote a scope program that is supposed to be a good one. I haven't tried that one. I am looking for a little space in time and some feedback from those who try it (also added to The Chart).

One other little tidbit. As I was discussing new modes with Paul in the QSO where the screenshot came from, the subject of Throb came up. He has been able to use it successfully. I haven't as yet. So, there I am, behind the times. Have to keep playing catch-up with all you guys.

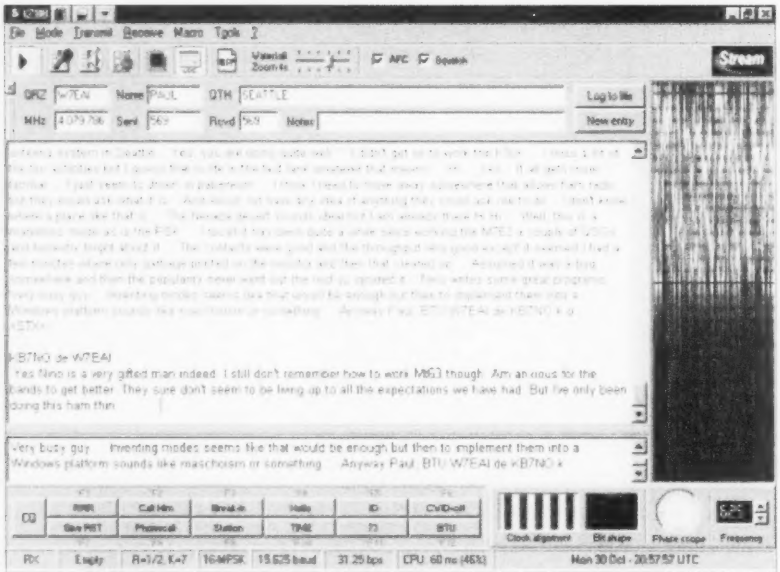

Fig. 1. Screenshot of Stream in MFSK16 mode. This software has a similar intuitive "feel" as with other ham soundcard communications programs, but there are some differences. The panel on the right is the "waterfall" I refer to as a "sidewinder." The signal enters and travels to the left. You fine tune with your mouse. See text and print the "Help" file. It tells what you need to know. When you attempt a type-ahead for the first time, you will suddenly realize the program instantly goes to "transmit" mode. There is an instruction to overcome this problem. Also, when you click "mode" you will be surprised to discover that three other modes including PSK31 are included in the package. The upper buttons that have audio icons on them automatically bring up the soundcard driver adjustment windows. A lot of thought has gone into this program and, finally, it looks like it may be taking hold. Another new mode! And for free!!

Continued on page 56

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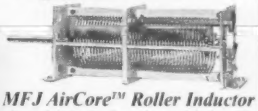

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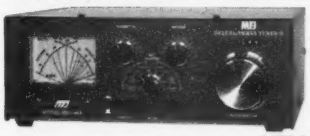

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Source for:	Web address (URL):
Mix W Soundcard program for PSK31, RTTY, new modes, MTTY, FSK31, more	http://tav.kiev.ua/~nick/my_ham_soft.htm http://users.nais.com/~jaffejim/mixwpage.htm
MMTTY New RTTY soundcard freeware plus links to other software	http://www.geocities.com/mmtty_rtty/
TrueTTY — Sound card RTTY w/ PSK31	www.dxsoft.com/mtrtty.htm
Pasokon SSTV programs & hardware	www.ultranet.com/~sstv/lite.html
PSK31 — Free — and much PSK info	http://aintel.bi.ehu.es/psk31.html
Interface for digital - rigs to computers	www.westmountainradio.com/RIGblaster.htm
Interface info for DIY digital hams	www.qsl.net/wm2u/interface.html
WinWarbler info and free download	www.qsl.net/winwarbler/
Site with links to PSK31 and Logger 7, also Zakanaka	www.geocities.com/kc4elo/
PSKGNR — Front end for PSK31	www.al-williams.com/wd5gnr/pskgnr.htm
Digipan — PSK31 — easy to use — new version 1.2	http://members.home.com/hteller/digipan/
TAPR — Lots of info	www.tapr.org
TNC to radio wiring help	http://freeweb.pdq.net/medcalf/ztx/
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Timewave DSP & AEA (prev.) products	www.timewave.com
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RCKRtty Windows program with free DL	http://www.rckrtty.de/
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SV2AGW free Win95 programs	www.raag.org/index1.htm
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BayCom — German site	www.baycom.de/
BayCom 1.5 and Manual.zip in English	www.cs.wvu.edu/~acm/gopher/Software/baycom/
Int'l Visual Communication Assn. — nonprofit org. dedicated to SSTV	www.mindspring.com/~sstv/
Creative Services Software	www.cssincorp.com
Hellschreiber & MT63 & Stream & scope	www.freeweb.org/varie/ninopo/iz8bly/index.htm

Table 1. *The Infamous Chart: Almost everything ... (updated monthly).*

Then there also occurred some other thoughts and remembrances I haven't been keeping up with — other software. I checked the ChromaPIX program with the setup I had been using for the other soundcard programs discussed here lately and it wasn't working to expectations. So I checked into the Silicon Pixels Web site to see what updates were available.

There came a major update which I downloaded, along with a new 35-page manual that is well worth the effort to download and print. Just about everything you ever will need to know to make the program perform flawlessly.

After downloading a fresh copy of ChromaPIX, I followed the instructions and removed the older program and installed the new. The format has few changes, but I tuned to 14.230 where there was a lot of QRM and some relatively weak image signals and then, with no adjustment whatsoever, the images started to appear on the screen. I was duly impressed.

I don't know what the difference was from the old to the new, but the old program, for whatever reason, was not decoding the SSTV and the new is simply great. I have read most of the new manual and that is a definite improvement over the old CPIX manual. Very well defined, plenty of clear examples, and understandable. I am not a graphics pro, but this program may cause me to turn a corner in my interests.

If you have questions or comments about this column, please E-mail me [jheller@sierra.net]. I will gladly share what I know or find a resource for you. For now, 73, Jack KB7NO. 73

The Digital Port

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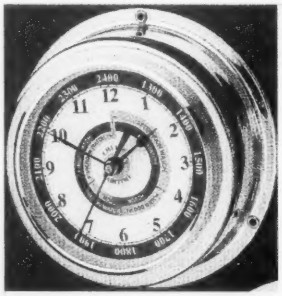
Actually, I think there is something wrong with my copy of Throb. I could never find a signal to decode and print, and then I determined that if I did, I wouldn't be able to contact them because the program seemed not to transmit. That will probably heal before this gets into print. I will download a fresh copy and reinstall. If it works for someone else, it should work here. Although that is not always true. I have a copy of a very popular piece of software that locks up when I go into the setup mode. But it receives and I believe I got it to transmit also. Computers are not all alike is one excuse. Hard to build a program that fits all sizes and shapes everywhere. Especially if you turn this ham loose on it.

I got so caught up in the new modes and the great soundcard programs in the last year or so that I realized I was ignoring one of the really fascinating aspects of ham radio. That is Slow Scan Television or SSTV as we commonly refer to it. *Continued*

Say You Saw it In *73!*



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QRX

continued from page 6

On Saturday we had several visitors drop by, which added to the excitement of the event. The Executive Director of the Biloxi Chamber, Harry B. Joachim, dropped by and chatted with us for a while. He presented us T-shirts with the new Biloxi Chamber logo on them. He also said that we would be able to use the building next year and in the years to come.

To promote the International Lighthouse/Lightship Weekend, we have tossed around the idea of sending NTS (National Traffic System) messages from the lighthouse. Our lighthouse is sort of unique because it is on the historical register, and the city conducts tours of the structure. Lots of tourists visit it. Harry told us that he would have a banner made for us, and all we needed to do is tell him what we wanted on it. ... I have never heard of a city that helped hams out as much as Biloxi MS. I am certainly glad that I stumbled onto this event.

Sunday was a slow day for participation. I arrived at the site around 7 a.m. and started operating the station. I added 50 QSOs to the list before I had to leave to attend church. I returned to the site around 1733 UTC and started calling CQ again, and it seemed like everyone in the world was waiting for me to get there. First I checked the other bands, and the only one that was producing Qs was 20 meters. Around 1800 UTC, Randy N5UE showed up and relieved me for a couple of hours, and after that we took turns operating.

Randy and I were the only operators for Sunday, but Kim N5XGI, my old standby, came by to help take down the station.

With the close of the day and a weekend well spent, we were very proud to have accumulated 933 QSOs and 17 lighthouses, with one station running and 4 operators. We are all looking forward to a better International Lighthouse/Lightship Weekend next year. Maybe we will be able to put up two stations and work more bands! 73

SV8 from the Geranium

continued from page 13

seemed to be working! Just after the Sun had set, more pressure was exerted to get ready to go out for dinner and enjoy the evening. Activity during the week fell into our well-established pattern of a couple of hours in the mornings, usually between 0600 and 0900 UTC, and a couple of hours in the afternoons, usually between 1500 and 1700 UTC.

With improved conditions in the last year, I was able to make more use of the higher bands. 18.1, 21, and 24.9 MHz produced most QSOs, at the expense of 7, 10.1 and 14 MHz. **Table 1** shows a comparison of activity by band over in the five years up to and including 1999.

I've never previously bothered to go on the air on the morning on which we leave, but made an exception last year, having missed a whole day's operating at the beginning of the week. The last hour was very slow, and the last QSO was with W3NZ on 14 MHz CW at 0629 UTC on 23 June 1999.

Special QSLs were printed and are available either from my *Callbook* address with return postage or via the RSGB bureau.

My special thanks to my wife Jan and to Paris and Maya Panayoyopoulos of the Geranium Apartments, without whose tolerance and encouragement these operations would not have been possible. 73

ATV Exciter

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As capacitors for the microwave buffer transistor, we use pieces of wire (yellow insulation) to provide loose coupling in and out. This prevents parasitic oscillation at 1.8 GHz, and makes the prescaler output look cleaner on the oscilloscope. I chose to use the 9.6 V supply for this BFR91, not the 12 V supply as shown in the diagram. Grant confirms that both supplies work. I found surface mount resistors, in quantities of 50, for the attenuator ahead of the ERA4 pre- driver chip. It has less gain, but was easier to obtain than the ERA5.

Having established that this exciter tunes, without jumping, over the desired frequency range, I connected my 23cm receiver to the AV input of the TV, and stuck 6cm-long bits of wire to the exciter output and the receiver antenna socket. (The 6cm wire is a 1/4 wave antenna.) Then I connected my video camera to the video input of the board. I switched on everything, and tuned the receiver. The image would not lock. Bother. Hang on, what do the

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switches do again on the receiver? Ah, the LEFT switch inverts the video polarity. Yippee! Now it works every time I try.

On several days, I spent up to an hour playing tapes from my camera through the 23cm setup, from the last Morris Tour and the last Auckland Folk Festival. **Photo D** was taken from the TV screen.

Thanks to Grant Taylor ZL1WTT and Wayne Griffin ZL1UJK for their documentation and assistance with this article.

Vaya Con (Ra)Dios

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and for 2 meters he has a Sommerkamp FT-290. He operates mostly on CW, some RTTY and SSB, and has over 210 entities for his DXCC. He has over 100 awards and he logs with KINGWIN, a Spanish program made by EA7ABW. Rodolfo has several types of QSL cards, one with a color photo showing the operator and his station.

The next one was in Catadau, 10 miles from Valencia: José EA5EE (**Photo Q**), a motorcycle mechanic licensed in 1979. His 38-foot-high tower is on the roof at 42 feet from the ground. José has a 3-element yagi for 10-15-20 meters, an inverted V for 40 and 80 meters, and a vertical for 2 meters. Just like many other Spanish hams. His rigs are: TS-850S, TS-140S, TS-50, three HTs, and four computers. He works SSB and SSTV, he is a contester and a DXer with over 150 entities. He logs with PLOG, a Spanish program made by EA5OL, and has two types of QSL cards.

When I entered José's radio shack, I did not know whether to grab a microphone or to kneel down and pray. It looks like a chapel, with lots of carved saints and pictures of saints on the back wall, behind his desk with his radio equipment. He even gave me a small picture of J.C., and I don't mean Juan Carlos. When I kneeled in front of him to take some photos from another angle, I had the distinct feeling that José blessed me. I hope the editors will choose to publish the photo of José EA5EE, so the readers will have the same religious encounter I experienced in his chapel-in-the-shack.

After this, we returned to Valencia and had a dinner in a little outdoor restaurant. Some children came by begging and handing out some leaflets saying that they are refugees from Romania. I spoke with one of them, as I had recognized the typical colorful clothing the gypsies were wearing; they were indeed Romanian gypsies doing what they do best — well, second best.

The next morning, I took the cheapest train I could get and returned to Barcelona. I had had lots of fun in Valencia because the visits were well organized and I could see lots of hams in a short period of time. Thanks to Eduard EA3NY who suggested this side trip, and to Pepe EA5KB and Enrique EA5AOR, who made it possible.

Calendar Events

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is available for those who do not have Internet access, but who are interested in the contest. Send an SASE to: *Crystal Radio Building Contest, c/o Lawrence A. Pizzella WR6K, 856 Ironwood Drive, San Jose CA 95125-2814.*

DEC 18–JAN 2

CINNAMINSON, NJ Join the Amateur Radio Lighthouse Society in their "Lighthouse Christmas Lights" special event, to promote public awareness of ham radio and lighthouses; to contribute to the recognition that lighthouses, lightships, and their keepers deserve; to foster camaraderie within the ham fraternity; and to provide fellowship amongst the members of the Amateur Radio Lighthouse Society. This is not a contest and you do not have to operate from a lighthouse in order to participate. Time: 0001 UTC Dec. 18th–2359 UTC Jan. 2nd. Modes: Any and all! SSB, FM, PSK, SSTV, even light beams and semaphores. Repeater operation is also allowed. Bands: Any authorized bands including WARC. Suggested frequencies (±20 kHz): 1.970, 3.970, 7270, 14.270, 21.370, 28.370. Procedure: Call CQ Lighthouse or CQ/LH. Exchange: ARLS members give out call sign, ARLS membership number (see your newsletter mailing label for yours if you don't know it), your name, and state or province. Nonmembers give callsign, name and state or province. Awards: Certificate for working 10 or more lighthouses/ships or 5 or more member ARLS stations. Send log info to *ARLS, P.O. Box 2178, Cinnaminson NJ 08077 USA.* Include SASE 9- x 12-inch envelope and $1 for return of certificate. Send questions via E-mail to *Jim K2JXW at [weidner@waterw.com].*

FEB 16–FEB 25

ST. SIMON ISLAND, GA The Third Annual International "Elmer Memorial" Crystal Radio DX Contest will take place from 1200 UTC on Friday 16 February 2001 to 1200 UTC on Sunday 25 February, 2001. Rules for this contest can be found at [http://www.thebest.net/wuggy/]. These contests have been coordinated to allow those who build a Crystal Radio to enter in the Building Contest, to use their creation in the DX contest and report on its performance in the DX contest. For those without Internet access, a hard copy of the rules for the DX contest can be obtained by sending an SASE to: *Crystal Radio DX Contest, c/o O. Pool WB4LFH, 216 Hermitage Way, St. Simon Island GA 31522.* You can hear lots of DX on the Broadcast band with the right kind of Crystal Set, Antenna, Ground and Phones. During the first two contests 1000+ mile DX was routinely logged. These were not just the 50kW clear channel stations, but many 1kW and 5kW stations. Those who want to learn how to make a high performance Crystal Set, or are just curious about what is involved, are invited to visit *[http://clubs.yahoo.com/clubs/thecrystalsetradioclub],* read the archived posts, look at the pictures of some crystal sets built by the members, and get to know this interesting group of "ultimate QRPers." 73

Homing In

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There's lots more to say and show about the 2000 ARDF World Championships. You'll be seeing it in "Homing In" and elsewhere in the ham radio press. My Web site has all the details of Team USA's individual and team performances, plus additional photos and links to reports by others. If this sport interests you, read all about it and find out what ARDF activities are taking place in your area. Maybe you'll be a competitor at the 2001 USA ARDF Championships, now being planned for the first August of the real new millennium.

Future Champs in the Scouts?

Here in Orange County, California, the annual Jamboree-On-The-Air (JOTA) on October 21 was bigger and better than ever. Over 870 Scouts descended on Rancho Alamitos High School in Garden Grove to participate in 13 ham radio exhibits, including HF, VHF, ARES, RACES, ATV, APRS/Packet, CW and hidden transmitter hunting. I put ten foxboxes on the school grounds, ranging from easy-to-spot ammunition cans in the bushes to a tiny micro-T taped on the pipes under a water fountain.

None of the Scouts had ever tried this activity before, so they all needed some quick training. Fortunately, I had some expert helpers, including Tom Curlee WB6UZZ (in **Photo E**), coauthor of our book on RDF. (*Transmitter Hunting—Radio Direction Finding Simplified,* by Moell and Curlee, is published by TAB/McGraw-Hill, ISBN number 007-1560068.) Also helping was 15-year-old Jay Thompson W6JAY (**Photo F**) and his father Richard WA6NOL. Both had just returned from the ARDF World Championships in China, where Jay had competed in the Junior Division.

Scouts usually arrived at our foxhunting booth in groups of two or three, sometimes more. We found that a good way to start explaining RDF to them was to point out how it's used to find Emergency Locator Transmitters of downed aircraft. The techniques are similar to those used by biologists tracking radio-tagged animals in nature TV shows that most Scouts have seen.

After seeing how the RDF gear works, one Scout from the group was selected to track a transmitter as the others followed. The youthful hunter got continuous help and encouragement, of course. When he found it, another Scout was selected to find another ammo-can fox nearby. The last hunter

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Stay Inside and Propagate

Midwinter brings the coldest temperatures and lowest maximum usable frequencies to the northern hemisphere. Propagation will range from good to very poor and will be much the same as last January. Operators glued by habit to the lower bands will be the most disappointed, while DXers probing 20 meters and higher should find useful openings to most areas of the world. Since propagation patterns are constantly shifting, it is best to explore all HF bands to find the most opportunities.

Good to seasonally average conditions should prevail until the 9th. After that, a succession of solar disturbances will make the HF bands a challenge, particularly 40 meters and above. The worst periods will begin on the 14th and 25th and last several days, while other poor stretches can be expected to begin on the 9th and 20th. The bright spots in the forecast are for the dates just prior to these events.

I expect that January will bring a false peak to the current sunspot cycle and will be followed by several months of slightly reduced activity. The final summit will most likely be reached in early summer. Although my conclusions are based on different criteria than those used by the professional scientific community, the consensus is the same.

Band-by-Band Summary

10-12 Meters

Opens to the east in the morning hours and slowly moves west with the sun, finally closing in Asia during the late afternoon. No openings are expected at night. Short skip can range from 1,000 to 2,500 miles.

15-17 Meters

Good daytime opportunities worldwide, especially into the southern hemisphere. Signals peak toward the east before noon, to the

January 2001

SUN	MON	TUE	WED	THU	FRI	SAT
	1 F-G	2 G	3 F-G	4 F	5 F-P	6 F-G
7 G	8 G	9 F-P	10 P	11 F-P	12 F	13 F-G
14 P	15 VP	16 P	17 F-P	18 F	19 F-G	20 F-P
21 F	22 F-G	23 F-G	24 F-G	25 P	26 VP	27 F-P
28 F-P	29 F-P	30 F	31 F-G			

EASTERN UNITED STATES TO:

GMT	00	02	04	06	08	10	12	14	16	18	20	22
Central America	15 (40)	20 (40)	20 (40)	(40)	(40)	(20-40)	(15) 20	10-20	10 (20)	10-17	10 (20)	(10) 20
South America	(15) 20	20 (40)	20 (40)	20 (40)	x	x	(15-20)	x	(10)	10 (15)	10 (20)	(10) 20
Western Europe	40	40	40	40	(40)	x	(10-20)	10 (20)	(10) 20	(15-20)	(20)	(20-40)
Southern Africa	(20-40)	(40)	x	x	x	x	x	(10-12)	10 (17)	(12) 17	(15-20)	20
Eastern Europe	(40)	(40)	x	x	(20)	x	(10-20)	(10) 20	(20)	x	x	x
Middle East	(40)	(40)	x	x	x	x	(10)	(10-15)	15 (20)	20	(20)	(20)
India/ Pakistan	x	x	x	x	x	x	x	(15-20)	x	x	x	(20)
Far East/ Japan	(15) 20	20	(20)	(20)	x	x	(20)	x	x	x	x	(10-20)
Southeast Asia	(15-20)	x	x	x	x	x	x	(10-20)	(10-15)	x	x	x
Australia	(10-17)	(15-20)	x	x	(20)	(30-40)	(20-40)	(10) 20	(10-20)	x	(20)	(10-15)
Alaska	15-17	20-30	x	x	x	20-30	20-30	15-17	15-17	x	x	15-17
Hawaii	(10) 15	(20)	20	(20)	20 (40)	40	(20-40)	(20)	(15-20)	x	(10)	10 (15)
Western USA	(10) 40	(15) 40	20-40	(20) 40	40	40	40	(20-40)	(10-20)	10-20	10-20	10-20

CENTRAL UNITED STATES TO:

Central America	(15) 20	20 (40)	(20) 40	(20) 40	(20) 40	40	(40)	(10) 20	10-20	10-15	10 (20)	15-20
South America	(15) 20	20	20 (40)	20 (40)	(20)	x	x	x	(10)	10	10 (20)	(10) 20
Western Europe	(40)	40	40	(40)	x	x	(20)	(15) 20	(10) 15	(15) 20	(20)	x
Southern Africa	20	(20)	x	x	x	x	x	x	(10-15)	(10) 15	15 (20)	20
Eastern Europe	x	(40)	x	x	x	x	x	(10) 20	(10-20)	x	x	x
Middle East	x	(40)	(20)	(20)	x	x	x	(10-15)	(10-15)	(20)	20	(20)
India/ Pakistan	x	(15)	x	x	x	x	(20)	x	(15)	x	x	x
Far East/ Japan	x	x	(20)	20	(20-40)	(40)	(20)	20	(15-20)	x	15	(15)
Southeast Asia	x	x	x	x	(20)	(20)	20	(15-20)	(15)	x	(15)	x
Australia	(10) 15	15	(15-20)	20	20 (40)	20-40	20 (40)	(20)	x	x	x	(10-15)
Alaska	15-17	15-17	x	x	x	(40)	(40)	20	20	x	x	x
Hawaii	(10) 15	(15-20)	20	20	(40)	(20-40)	20 (40)	x	(15)	(15)	(15)	(10) 15

WESTERN UNITED STATES TO:

Central America	(20-40)	40	40	40	(40)	x	(20)	(10) 20	10 (20)	10 (20)	(10) 20	(15) 20
South America	17 (40)	(20)	x	x	x	x	x	(15)	12 (20)	10-20	10-20	12 (40)
Western Europe	x	x	(40)	(20)	(20)	x	(20)	(10-20)	(10) 20	(20)	x	x
Southern Africa	(20)	x	x	x	x	x	x	x	(10)	(15)	15 (20)	(15) 20
Eastern Europe	x	x	x	x	x	x	x	x	x	x	x	x
Middle East	(20)	(40)	(20)	20	20	(20)	x	(15)	(10) 15	(10-15)	(20)	(20)
India/ Pakistan	(15-20)	x	x	x	x	x	(20)	x	x	x	x	x
Far East/ Japan	(10) 20	(15-20)	x	x	(40)	40	(40)	x	x	x	(10-20)	10-20
Southeast Asia	(15)	(20)	x	x	x	x	x	(20)	(15) 20	(20)	(10-15)	10-15
Australia	(10-15)	(15-20)	x	x	x	(20-40)	(20-40)	20	(15-20)	15	(10-15)	10
Alaska	10-15	x	x	20-30	20-30	20-30	20-40	x	20	15	x	15-17
Hawaii	(15) 20	(15) 20	20	(20)	(40)	40	(20-40)	(15) 20	15 (20)	(10-15)	10 (15)	(10) 15
Eastern USA	(10) 40	(15) 40	20-40	(20) 40	40	40	(20-40)	(10-20)	10-20	10-20	10-20	10-20

Table 1. *Dual numbers indicate that the intervening bands should also be usable. When one number appears in parentheses, that end of the range will probably be open on Good (G) days only.*

south around midday, and westward in the afternoon. Short-skip beyond 1,000 miles is typical.

20 Meters

20 meters will not be quite as reliable as usual because of solar activity, but is still the most versatile HF band. Openings begin at dawn and last into the early evening hours. On better days the band will remain open even later, especially toward the south. Short-skip is typically between 500 and 2,500 miles.

30-40 Meters

Best from sunset until sunrise. On good days Europe and Africa can be open all evening, with Central and South America dominating the nighttime hours. The Pacific is strongest after midnight, while Asia peaks near sunrise. Atmospheric static should be fairly low this month but will still limit communications. Short-skip extends beyond 700 miles at night and is between 100 and 1,000 miles during the day.

80-160 Meters

Expect some nice surprises, especially when atmospheric noise isn't too strong. Short-skip on 80 meters is beyond 2,000 miles at night but limited to about 300 miles during the day. 160 meters will probably be useless during the day but can provide short-skip from 1,000 to 2,000 miles after dark. Domestic activity on 160 meters usually peaks in the evening hours.

Happy New Year! 73

Homing In

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of the group, who had received the benefit of watching all the others' mistakes, got to find a well-disguised micro-T for a surprise ending.

For demonstration hunts like this, it's best if the fox transmitters are on different frequencies and run continuously, or nearly so. Short transmissions are OK for experts, but are discouraging to complete beginners. Success for every Scout is the goal, so don't make it too hard.

One-piece ARDF receiver/antenna sets with earphones, continuous tuning, and tone-pitch S-meter are preferred by champions, but they aren't suitable for situations like this. A simple beam, offset attenuator, and a scanner or handie-talkie with S-meter works best, because the instructor and everyone in the group can hear the signal and see the meter. This also demonstrates how simple and inexpensive an on-foot RDF setup can be. Plans for the yagis and attenuators are readily available on the Web. "Tape measure" yagis are safest for children to carry.

Southern California wasn't the only place where JOTA-2000 included radio foxhunting. In Albuquerque, New Mexico, regular transmitter hunters Mike Pendley K5ATM, Mike Eaton K5MJE, and Brian Mileshosky N5ZGT introduced Scouts to this sport at the local Council office.

What about your town? Start planning now to make radiosports an important part of ham radio in the new millennium. For more ideas about ARDF for Scouts and JOTA, see "Homing In" for January 1997 and the "Homing In" Web site. 73

On the Go

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Mission-Specific Nets: Although not an organization, any disaster will have the support of one or more nets which may be coordinated by one or more of the above organizations. During the development of a hurricane, you'll find the Hurricane Watch Net keeping tabs on things and meeting on 14.325 MHz. After a storm, nets will be set up to control and manage the message traffic into the disaster area. This may coordinate messages from NTS and/or requests for information about health and welfare submitted to the Red Cross, Salvation Army, or other group.

Of course we can expect the list to grow even more in the future. The Family Radio Service (FRS) has become increasingly popular for families keeping track of one another on vacation, at amusement parks, etc. Naturally, if someone with an FRS radio finds himself in a difficult situation, it is only normal that he would call for assistance using FRS. We are now seeing cases whereby an FRS user hears someone calling for help and alerts the appropriate agency for assistance. It is only a matter of time before some type of method is established which incorporates FRS into an emergency system like using channel 9 on Citizens Band.

Given all these choices, there must be at least one that appeals to you as a way to make a difference and contribute back to the community. Give it some thought, and let me know if you find a home where you can help out when things get a little out of control. 73

73 Congrats To

• Richard C. Johnson W3BI, Nazareth PA — Scheduled to receive the Coast Guard's second highest civilian honor, the Meritorious Public Service Award, in recognition of 37 years' service as a MARS operator. *(Thnx Petty Officer Kim Wilder, USCG, Portsmouth VA)*

• Nebraska's Ak-Sar-Ben ARC — Winner of the ARRL/ham industry competition for promoting the ARS-themed movie *Frequency*. *(Thnx WAØWRI, via* Newsline*)*

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NEVER SAY DIE

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hit, and then again with the industrial revolution, which changed populations from being largely farmers to production line workers, and moved millions of people to cities.

The recent high-tech explosion in computers, communications, and transportation, with the incredible ballooning of the Internet, is changing the world again.

Just as shopping malls and strips killed downtown shopping, Internet shopping is starting to change the whole product marketing and distribution system.

When personal computers started in 1975, it was only a year until we started seeing computer stores opening. Indeed, I started with five stores I opened in the greater Boston and the southern New Hampshire area. This grew to a national chain of 58 software centers. But I saw the handwriting on the wall, with the entry of mail order stores offering a wider variety of products and overnight delivery — so I sold the chain. Today, in place of thousands of computer stores, we have a half dozen mail order giants. No more distributors. A few retail stores. And this is still before anywhere near the full impact of the Internet has hit.

The Internet is going to put more and more of a squeeze on prices, pushing out smaller and less efficiently managed retailers, and making it almost impossible for small stores to survive. Even entertainment complex super malls such as the one in Edmonton will not be able to survive the loss of their retail stores.

With groceries, clothes, and just about everything else being sold via the Internet, the business world of 2020 is likely to be vastly different from today, just as our world today is totally different from that of 1900 — it's just that changes are happening faster and faster.

Education, too, will be sold and delivered via the Internet, with bricks and mortar schools only needed to provide the hardware needed for people to build skills, and a baby-sitting function. Of course, with virtual laboratories, even the need for electronic and chem labs can be covered via software.

This is the world of 2020 for which school administrators should plan, but probably won't.

Most of the courses people need to pursue the three major career paths will be available via the Internet. However, once the word starts getting out about the advantages of pursuing an entrepreneurial path, one aimed at eventually starting and running one's own business (and I don't mean a mom-and-pop store), the interest in job-oriented careers will inevitably diminish.

What benefits can the college of 2020 provide that students will feel is worth $100,000 (or more) and a four-year investment?

The jobs of the future will be in high-tech research and development, manufacturing (done mostly in some other lower-cost, better-educated country), marketing, sales, and service (installation and repairs). Products will mostly be sold via video demonstrations on the Internet and by price.

Print media looks as if it will eventually be replaced by webpapers and webzines, and books will be automatically printed on demand by two or three Internet megabook companies. Retail book stores could be blown away.

We're already seeing television recording systems which automatically record any program that fits your interest profile. The next step will be the alerting of potential customers when a new book is being published which their interest profile suggests they might want. And, with the sale of 100% of all printed books, or even a download of the text, book costs will be reduced, so authors will do better.

The babies being born today will be of college age by 2017. Why would they want to run up big debts in order to sit in a class, listening to a grad student teacher subbing for a professor, when they can get even better information via the Internet, taught by a star performer, complete with a million bucks worth of graphics and enough interactivity to answer just about any questions?

Sherry has almost a hundred how-to-dance videos she sells. Her star is Kathy Blake, who's taught thousands of students, so she knows where people are going to have problems and what their questions are going to be. She answers those questions in her videos. The result is that her video dance lessons are so much better than anything else out there that once people discover them, they buy one video after another and are devoted fans. Her dance instruction is far better than 99.9% of the studio instructors can provide.

In all of my high school years I had only one exciting teacher. Ditto college. With video teaching, good teachers will be in high demand. These will be the exciting performers.

The picture for the survival of universities 20 years from now looks grim. I know, if I were to be consulted by a college president today, I'd recommend, as a first measure, that the university's business school start polling the alumni every year, asking them which of the courses they took have benefited them in their careers. And I'd have them also ask which courses they wish they'd had an opportunity to take. That would give the university feedback to help it adapt to the real needs of its students.

For the longer run, I'd get busy and start teaching the things a small business person needs to know. And I'd have the students produce video teaching courses. These could not only give the students a wide variety of business experiences, but would pay off for both them and the school.

Video business courses would be of interest to both youngsters and business people. Courses such as advertising fundamentals, accounting, business law, printing, speed reading, purchasing, warehousing, shipping alternatives, packaging, and promotion would be very popular.

Well, there's the future as I see it. Colleges that pioneer the way to 2020 will be in the best situation to stay in business. The future is going to present unlimited opportunities for entrepreneurs, as smaller businesses gradually replace today's giants.

There won't be any need for a PC Connection when we can buy every computer component, accessory, program, and other supplies directly from the manufacturers via the Web. And the savings from knocking out the retailers will be mostly passed along to us customers.

How long will it be in the ham field before Kenwood or Yaesu will be selling directly to us through an Internet site? Service? Please plug your transceiver into your computer with the supplied cable so they can diagnose any problems you're having from their HQ in Tokyo and UPS you a replacement module.

Magazines 2020

What will magazines be like in 20 years? I've got my robe and pointy seer hat on, and my crystal ball all warmed up.

Actually, it doesn't take much of a prophet to see where things are heading, it's just a question of how long it's going to take to get there. Normally, I'd predict the thousands of magazine titles now decorating newsstands, book stores, supermarkets, and so on, would be delivered via the Web within ten years, but I'm usually overly optimistic about how fast new technologies will be accepted, so let's say we'll be there by 2020.

We're already seeing more than shadows of what's coming in the growing number of dot-com ads in magazines. Well, that makes sense, particularly for general interest magazines, where advertising costs are so high that it's prohibitively expensive to present much of a sales talk via magazine ads. With a Web site the lid is off. There, an advertiser

Continued on page 64

Wise Up!

Here are some of my books which can change your life (if you'll let 'em). If the idea of being healthy, wealthy and wise interests you, start reading. Yes, you can be all that, but only when you know the secrets which I've spent a lifetime uncovering.

.....Wayne

The Bioelectrifier Handbook: This explains how to build or buy ($155) a little electrical gadget that can help clean the blood of any virus, microbe, parasite, fungus or yeast. The process was discovered by scientists at the Albert Einstein College of Medicine, quickly patented, and hushed up. It's curing AIDS, hepatitis C, and a bunch of other serious illnesses. The circuit can be built for under $20 from the instructions in the book. $10 (#01)

The Secret Guide to Wisdom: This is a review of around a hundred books that will help you change your life. No, I don't sell these books. They're on a wide range of subjects and will help to make you a very interesting person. Wait'll you see some of the gems you've missed reading. $5 (#02)

The Secret Guide to Wealth: Just as with health, you'll find that you have been brainwashed by "the system" into a pattern of life that will keep you from ever making much money and having the freedom to travel and do what you want. I explain how anyone can get a dream job with no college, no résumé, and even without any experience. I explain how you can get someone to happily pay you to learn what you need to know to start your own business. $5 (#03)

The Secret Guide to Health: Yes, there really is a secret to regaining your health and adding 30 to 60 years of healthy living to your life. The answer is simple, but it means making some difficult lifestyle changes. Will you be skiing the slopes of Aspen with me when you're 90 or doddering around a nursing home? Or pushing up daisies? No, I'm not selling any health products. $5 (#04)

My WWII Submarine Adventures: Yes, I spent from 1943-1945 on a submarine, right in the middle of the war with Japan. We almost got sunk several times, and twice I was in the right place at the right time to save the boat. What's it really like to be depth charged? And what's the daily life aboard a submarine like? How about the Amelia Earhart inside story?If you're near Mobile, please visit the Drum. $5 (#10)

Wayne's Caribbean Adventures: My super budget travel stories – where I visit the hams and scuba dive most of the islands of the Caribbean. You'll love the special Liat fare which let me visit 11 countries in 21 days, diving all but one of the islands, Guadeloupe, where the hams kept me too busy with parties. $5 (#12)

Cold Fusion Overview: This is both a brief history of cold fusion, which I predict will be one of the largest industries in the world in the 21st century, plus a simple explanation of how and why it works. This new field is going to generate a whole new bunch of billionaires, just as the personal computer industry did. $5 (#20)

Cold Fusion Journal: They laughed when I predicted the PC industry growth in 1975. PCs are now the third largest industry in the world. The cold fusion ground floor is still wide open, but then that might mean giving up watching ball games. Sample: $10 (#22).

Julian Schwinger: A Nobel laureate's talk about cold fusion—confirming its validity. $2 (#24)

Improving State Government: Here are 24 ways that state governments can cut expenses enormously, while providing far better service. I explain how any government bureau or department can be gotten to cut it's expenses by at least 50% in three years and do it cooperatively and enthusiastically. I explain how, by applying a new technology, the state can make it possible to provide all needed services without having to levy *any* taxes at all! Read the book, run for your legislature, and let's get busy making this country work like its founders wanted it to. Don't leave this for "someone else" to do. $5 (#30)

Mankind's Extinction Predictions: If any one of the experts who have written books predicting a soon-to-come catastrophe which will virtually wipe most of us out are right, we're in trouble. In this book I explain about the various disaster scenarios, like Nostradamus, who says the poles will soon shift (as they have several times in the past), wiping out 97% of mankind. Okay, so he's made a long string of past lucky guesses. The worst part of these predictions is the accuracy record of some of the experts. Will it be a pole shift, a new ice age, a massive solar flare, a comet or asteroid, a bioterrorist attack? I'm getting ready, how about you? $5 (#31)

Moondoggle: After reading René's book, *NASA Mooned America*, I read everything I could find on our Moon landings. I watched the videos, looked carefully at the photos, read the astronaut's biographies, and talked with some of my readers who worked for NASA. This book cites 25 good reasons I believe the whole Apollo program had to have been faked. $5 (#32)

Classical Music Guide: A list of 100 CDs which will provide you with an outstanding collection of the finest classical music ever written. This is what you need to help you reduce stress. Classical music also raises youngster's IQs, helps plants grow faster, and will make you healthier. Just wait'll you hear some of Gotschalk's fabulous music! $5 (#33)

The Radar Coverup: Is police radar dangerous? Ross Adey K6UI, a world authority, confirms the dangers of radio and magnetic fields. $3 (#34)

Three Gatto Talks: A prize-winning teacher explains what's wrong with American schools and why our kids are not being educated. Why are Swedish youngsters, who start school at 7 years of age, leaving our kids in the dust? Our kids are intentionally being dumbed down by our school system — the least effective and most expensive in the world. $5 (#35)

Aspartame: a.k.a. NutraSweet, the stuff in diet drinks, etc., can cause all kinds of serious health problems. Multiple sclerosis, for one. Read all about it, two pamphlets for a buck. (#38)

One Hour CW: Using this sneaky booklet even *you* can learn the Morse Code in one hour and pass that dumb 5wpm HF entry test. $5 (#40)

Code Tape (T5): This tape will teach you the letters, numbers and punctuation you need to know if you are going on to learn the code at 13 or 20 wpm. $5 (#41)

Code Tape (T13): Once you know the code for the letters (#41) you can go immediately to copying 13 wpm (using my system). This should only take a couple of days. $5 (#42)

Code Tape (T20): Or, you can start right out at 20 wpm and master it in a weekend. $5 (#43)

Wayne Un-Dayton Talk: This is a 90-minute tape of the talk I'd have given at the Dayton, if invited. $5 (#50)

Wayne Tampa Talk: This is the talk I gave at the Tampa Global Sciences conference—where I cover amateur radio, cold fusion, health, books you should read, and so on. $5 (#51)

$1 Million Sales Video: The secret of how you can generate an extra million dollars in sales just by using PR. This will be one of the best investments you or your business will ever make. $40 (#52)

Reprints of My Editorials from *73*. Very few things in this world are as we've been taught, and as they appear. I blow the whistle on the scams around us, such as the health care, our school system,, our money, the drug war, a college education, sugar, the food giants, our unhealthy food, fluorides, EMFs, NutraSweet, etc.

1996 Editorials: 120 pages, 100 choice editorials. $10 (#72)

1997 Editorials: 148 fun-packed pages. 216 editorials. $10 (#74)

1998 Editorials: 168 pages that'll give you lots of controversial things to talk about on the air. $10 (#75)

1999 Editorials: 132 pages of ideas, book reviews, health, education, and anything else I think you ought to know about. $10 (#76)

2000 Editorials: In the works.

Silver Wire: With two 3-in. pieces of heavy pure silver wire + three 9V batteries you can make a thousand dollars' worth of silver colloid. What do you do with it? It does what the antibiotics do, but germs can't adapt to it. Use it to get rid of germs on food, for skin fungus, warts, and even to drink. Read some books on the uses of silver colloid, it's like magic. $15 (#80)

Wayne's Bell Saver Kit. The cable and instructions enabling you to inexpensively tape Art Bell W6OBB's nightly 5-hr radio talk show. $5 (#83)

NH Reform Party Keynote Speech. It wow'd 'em when I laid out plans for NH in 2020, with much better, yet lower-cost schools, zero state taxes, far better health care, a more responsive state government, etc. $1 (#85)

Stuff I didn't write, but you need:

NASA Mooned America: René makes an air-tight case that NASA faked the Moon landings. This book will convince even you. $25 (#90)

Last Skeptic of Science: This is René's book where he debunks a bunch of accepted scientific beliefs – such as the ice ages, the Earth being a magnet, the Moon causing the tides, and etc. $25 (#91)

Dark Moon: 568 pages of carefully researched proof that the Apollo Moon landings were a hoax—a capping blow for René's skeptics. $35 (#92)

Radio Bookshop

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Address _____

City-State-Zip _____

Use the numbers in the brackets or copy page and mark the books you want. Add $3 s/h per total order in US ($5 priority mail). $6Can. $10 foreign. _____

Order total: US$_____ Phone (for CC orders) _____

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☐ Yes! Put me down for a year of *73* for only $25 (a steal). Canada US$32. Foreign US$44 by sea.

☐ I'd like to get more romance into my dreary life so send me your How-To-Dance Videos catalog.

☐ I need some industrial strength stress reduction so send me your Adventures In Music CD catalog

Allow 4 weeks for delivery except foreign, though we try to get most orders shipped in a day or two.

Barter 'n' Buy

Turn your old ham and computer gear into cash now. Sure, you can wait for a hamfest to try and dump it, but you know you'll get a far more realistic price if you have it out where 100,000 active ham potential buyers can see it, rather than the few hundred local hams who come by a flea market table. Check your attic, garage, cellar and closet shelves and get cash for your ham and computer gear before it's too old to sell. You know you're not going to use it again, so why leave it for your widow to throw out? That stuff isn't getting any younger!

The *73* Flea Market, Barter 'n' Buy, costs you peanuts (almost)— comes to 35 cents a word for individual (noncommercial!) ads and $1.00 a word for commercial ads. Don't plan on telling a long story. Use abbreviations, cram it in. But be honest. There are plenty of hams who love to fix things, so if it doesn't work, say so.

Make your list, count the words, including your call, address and phone number. Include a check or your credit card number and expiration. If you're placing a commercial ad, include an additional phone number, separate from your ad.

This is a monthly magazine, not a daily newspaper, so figure a couple months before the action starts; then be prepared. If you get too many calls, you priced it low. If you don't get many calls, too high.

So get busy. Blow the dust off, check everything out, make sure it still works right and maybe you can help make a ham newcomer or retired old timer happy with that rig you're not using now. Or you might get busy on your computer and put together a list of small gear/parts to send to those interested?

Send your ads and payment to: *73 Magazine*, Barter 'n' Buy, 70 Hancock Rd., Peterborough NH 03458 and get set for the phone calls. The deadline for the March 2001 classified ad section is January 10, 2001.

President Clinton probably doesn't have a copy of *Tormet's Electronics Bench Reference* but you should. Check it out at **[www.ohio.net/~rtormet/index.htm]**—over 100 pages of circuits, tables, RF design information, sources, etc. BNB530

TELEGRAPH COLLECTOR'S PRICE GUIDE: 250 pictures/prices. $12 postpaid. **ARTIFAX BOOKS**, Box 88, Maynard MA 01754. Telegraph Museum: [http://wltp.com]. BNB113

Great New Reference Manual with over 100 pgs of P/S, transistor, radio, op-amp, antenna designs, coil winding tables, etc. See details at [www.ohio.net/~rtormet/index.htm] or send check or M.O. for $19.95 + $2.00 P&H to RMT Engineering, 6863 Buffham Rd., Seville OH 44273. BNB202

RF TRANSISTORS TUBES 2SC2879, 2SC1971, 2SC1972, MRF247, MRF455, MB8719, 2SC1307, 2SC2029, MRF454, 2SC3133, 4CX250B, 12DQ6, 6KG6A, etc. **WESTGATE**, 1-800- 213-4563. BNB6000

QSL CARDS. Basic Styles; Black and White and Color Picture Cards; Custom Printed. Send 2 stamps for samples and literature. RAUM'S, 8617 Orchard Rd., Coopersburg PA 18036. Phone or FAX (215) 679-7238. BNB519

Cash for Collins: Buy any Collins Equipment. **Leo KJ6HI.** Tel./FAX (310) 670-6969. [radioleo@earthlink.net]. BNB425

Browse our web site and check out the **"Monthly Special."** TDL Technology, Inc. **www.zianet.com/tdl.** BNB500

MAHLON LOOMIS, INVENTOR OF RADIO, by Thomas Appleby (copyright 1967). Second printing available from **JOHAN K.V. SVANHOLM N3RF**, SVANHOLM RESEARCH LABORATORIES, P.O. Box 81, Washington DC 20044. Please send $25.00 donation with $5.00 for S&H. BNB420

Ham Radio Repair, Quality workmanship. All Brands, Fast Service. **Affordable Electronics**, 7110 E. Thomas Rd., Scottsdale, AZ 85251. **Call 480-970-0963**, or E-mail **HAM SERVICE@AOL.COM.** BNB427

METHOD TO LEARN MORSE CODE FAST AND WITHOUT HANGUPS Johan N3RF. Send $1.00 & SASE. SVANHOLM RESEARCH LABORATORIES, P.O. Box 81, Washington DC 20044 USA. BNB421

ASTRON power supply, brand-new w/warranty. RS20M $99, RS35M $145, RS50M $209, RS70M $249. **Web:** [www.aventrade.com]. Call for other models. **(626) 286-0118.** BNB411

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Electricity, Magnetism, Gravity, The Big Bang. New explanation of basic forces of nature in this 91-page book covering early scientific theories and exploring latest controversial conclusions on their relationship to a unified field theory. To order, send check or money order for $16.95 to: American Science Innovations, PO Box 155, Clarington OH 43915. Web site for other products [http://www.asi_2000. com]. BNB100

COLLOIDAL SILVER GENERATOR! Why buy a "box of batteries" for hundreds of dollars? Current regulated, AC powered, fully assembled with #12 AWG silver electrodes, $74.50. Same, but DC powered, $54.50. Add $2.50 shipping. **Thomas Miller**, 962 Myers Parkway, Ashland OH 44805. BNB342

COLD FUSION! - FUEL CELL! - ELECTRIC BICYCLE! Each educational kit: (Basic - $99.95, Deluxe - $199.95, Information - $9.95.) CATALOG - $5.00. ELECTRIC AUTOMOBILE BOOK - $19.95. **KAYLOR-KIT**, POB 1550ST, Boulder Creek CA 95006-1550. (831) 338-2300. BNB128

ANTENNA SCIENCE: Why do antennas radiate electromagnetic waves? Learn for yourself from this enlightening paper by **MAX RESEARCH.** Gain an understanding of the radiation mechanism of antennas! Written in a clear style for radio hobbyists, inquisitive amateurs and experimenters. $4.95 ... ppd. Order from **MAX RESEARCH**, P.O. Box 1306, East Northport, NY 11731. BNB426

ROHN TOWERS HUGE DISCOUNTS CHECK PRICES AT HILLRADIO.NET BNB600

K8CX HAM GALLERY http://hamgallery.com BNB620

SAN DIEGO HAMS: Kenwood Station TS430S, PS430, AT250, SP430, MC425, HS5, plus 3-el. 10mtr Beam, 40-10 Meter Dipole, VOMeter, SWR Bridge, Grid Dip $700.00 W6RET, 619-562-1774, Santee. BNB621

NEVER SAY DIE

continued from page 62

can present a total sales pitch, complete with an ordering option.

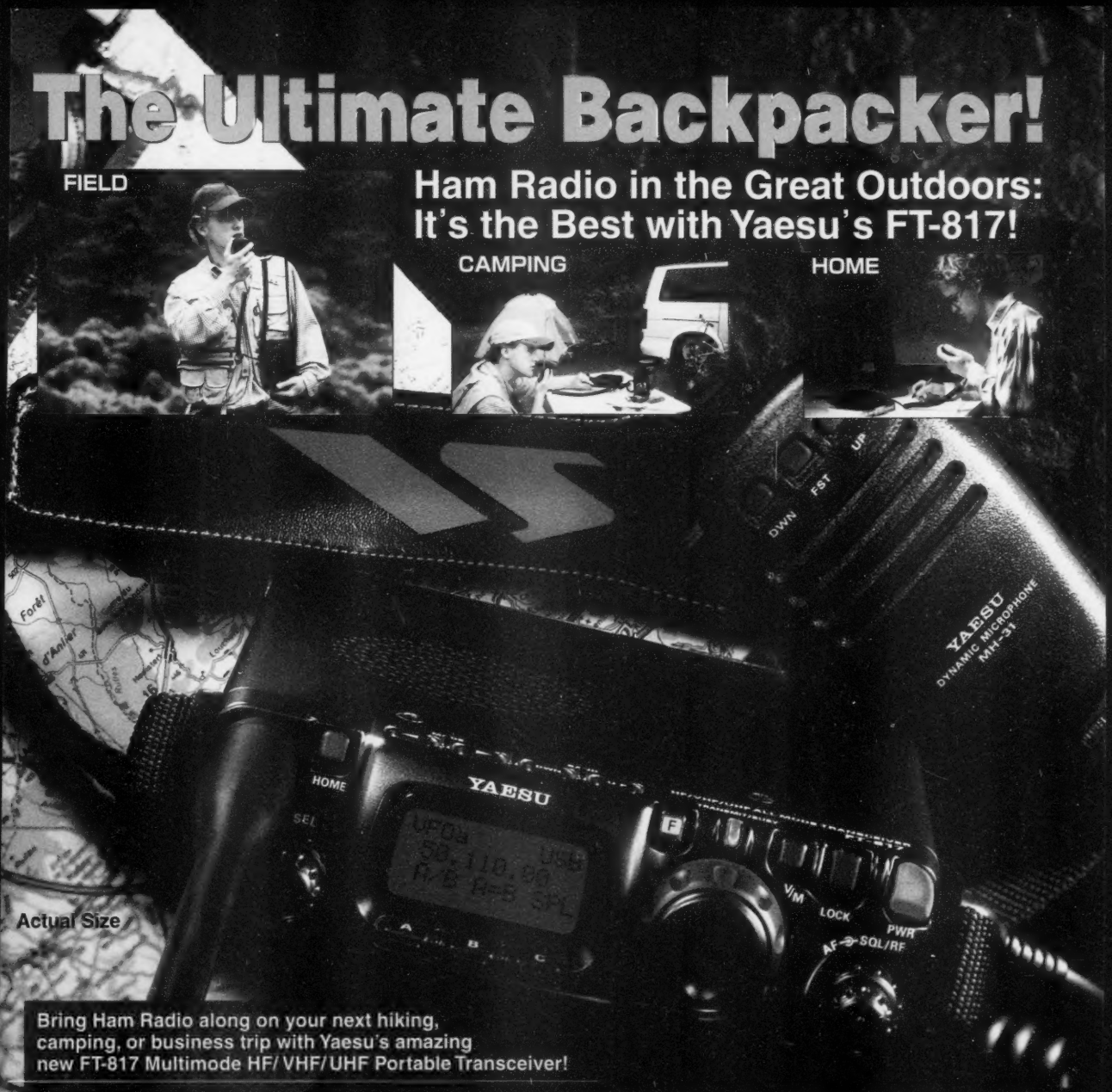
Web ads can include beautiful pictures, technical descriptions, videos, the works, with as much or little detail as customers want. Thus, all a magazine ad has to do is get potential customers to visit the Web site. Well, with Web publications, we'll probably see about the same thing happening, with the webzine getting a piece of the action when a reader clicks over to an advertiser's site, plus a commission if a sale is made.

We'll be seeing advertisers making a much bigger effort than they do today to have their product included in articles the magazine publishes. I'd love to have ham companies rustle up articles for 73 which would help to sell their products, but most of 'em just can't be bothered.

The subscription cost of webzines will be much lower than at present since there won't be the printing, paper, and mailing costs for the magazines. And this will kill newsstand sales, which are often losses for publishers, with the difference having to be made up by the advertisers. 73

The Ultimate Backpacker!

Ham Radio in the Great Outdoors: It's the Best with Yaesu's FT-817!



Bring Ham Radio along on your next hiking, camping, or business trip with Yaesu's amazing new FT-817 Multimode HF/ VHF/ UHF Portable Transceiver!

●ULTRA COMPACT: Measuring just 5.3" x 1.5" x 6.5" WHD (135 x 38 x 165 mm) and weighing about 2 1/2 pounds (1.17 kg, including the supplied antenna and alkaline cells), the FT-817 is small and light enough to take along wherever you're going.

●WIDE FREQUENCY COVERAGE: 160-10 meters on HF, plus the 50, 144, and 430 MHz Amateur bands. Plus FM Broadcast, AM Aircraft, and Public Safety receiver coverage.

●MULTIMODE DESIGN: Ready for action on SSB, CW, AM, FM, FM-Wide (Rx), 1200/9600 bps Packet, and Digital, including dedicated USB and LSB PSK-31 configurations.

●5 WATTS POWER OUTPUT: Using a new-technology all-band MOS FET power amplifier, the FT-817 provides 5 Watts of power output when using a 13.8 Volt DC source. When using Alkaline batteries or the optional FNB-72 Ni-Cd Battery Pack, power is automatically set to 2.5 Watts. via Menu, this can be changed to 0.5 Watt, 1 Watt, or up to 5 Watts.

●WIDE CHOICE OF POWER SOURCES: The FT-817 is equipped with an alkaline "AA" cell battery case, and a 13.8 volt DC cable is also supplied. Available as an option is the FNB-72 Ni-Cd Battery Pack (9.6 V, 1000 mAh), which can be recharged using a 13.8 Volt power supply while the radio is being operated.

●TWO ANTENNA PORTS: A "BNC" connector is provided on the front panel, and a type "M" connector on the rear panel, with Menu selection of which connector will be assigned for operation on HF, 50 MHz, 144 MHz, and 430 MHz.

●OPTIONAL 10-POLE COLLINS MECHANICAL FILTERS: An optional filter slot is provided, accommodating either the YF-122S (2.3 kHz) SSB filter or the YF-122C(500 Hz) CW filter. You get "base station" performance even from a mountain top.

●INCREDIBLE MEMORY RESOURCES: You get a total of 208 memories, including 200 "regular" memories which may be separated into ten groups of up to 20 channels each. And you can append an Alpha-Numeric "Tag" to each memory to aid in channel identification.

●A CW OPERATOR'S DREAM MACHINE: You get a built-in Electronic Keyer with adjustable weighting, adjustable CW Pitch, CW Normal/Reverse frequency tuning, and you can even use the microphone's UP and DOWN keys to send CW via the Keyer.

●BUILT-IN CTCSS AND DCS: The built-in CTCSS and DCS Encoder/Decoder systems provide you with the versatility you need for repeater access or selective calling.

●DUAL - COLOR LIQUID CRYSTAL DISPLAY: Select from Blue or Amber display illumination, which can also be switched off to conserve battery life. And while you're away, the Spectrum Scope will provide you with a visual record of activity ±5 channels from your current operating frequency.

ALL MODE PORTABLE TRANSCEIVER

FT-817

HF/50/144/430 MHz Multimode Transceiver

YAESU

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See the exciting new FT-817 at your Yaesu Dealer's showroom today!

TS-2000

Then There Was Light...

World's 1st HF Backlit Front Key Panel

...The All New TS-2000 Multi Band/Multi Mode Transceiver **Coming Soon!**

The all new Kenwood **TS-2000** series transceiver offers today's demanding Amateur operator high performance standards without the compromising limitations found in other similar multi-band, multi-mode transceivers. The **TS-2000** offers users three distinct operation platforms, the traditional transceiver with full function front panel, or the high-tech looking "silver box" version that allows mobile operation with the new RC-2000 compact control head, or the ARCP-2000 computer control program making the **TS-B2000** functional from your personal computer. The new **TS-2000** offers 100 watts on HF, 6 meters and 2 meters, 50 watts on 70cm, and when you install the optional UT-20 1.2 GHz module at 10 watts, you will have assembled the most complete dual receiver multi-mode transceiver ever produced. If you are waiting for PH3D, you will be happy to know the **TS-2000** is transverter frequency display function ready to work the latest satellite frequencies available.

IF stage DSP in the main band and AF stage DSP in the sub-band provide unparalleled noise reduction performance. Because the **TS-2000** has a built-in TNC, DX Packet cluster is available on the sub-band and can automatically shift the desired HF or 6 Meter frequencies direct to the main band for instant contacts. A weekend DXer's dream come true. You will also be sure to enjoy the built-in antenna tuner, 5+1 antenna ports, RS-232 terminal and the world's first HF fully backlighted front control panel.

The **TS-2000** multi-band multi-mode transceiver, the most high performance Amateur Radio ever produced.

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